[illegible] In [illegible] Part One No. 1

CHEMICAL INDUSTRIES

The Chemical Business Magazine

So it's a

WAR OF PRODUCTION!

If that is what this war basically resolves itself into . . . THEN WE'LL WIN IT!

America can out-produce any or *all* of those who have aligned themselves against us . . . It is no longer a question of time until our plants are made ready. The basic tooling-up is done. We are producing *now!*

Alkalies are used either directly or indirectly by practically every industry engaged in making our vital war materials . . . used in quantities far in excess of peace time requirements.

If delays, or even curtailments, of alkali shipments cause you inconvenience or hardship, remember that while we are producing in larger quantities than ever before . . . this production is being largely diverted into industries making war materials for the protection of the Nation!

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

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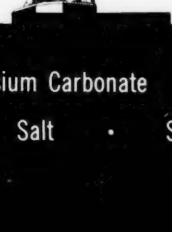

Soda Ash • Caustic Soda • Caustic Potash • Modified Sodas • Para-dichlorobenzene • Potassium Carbonate • Chlorine
Ammonium Bicarbonate • Ammonium Chloride • Calcium Chloride • Causticized Ash • Salt • Sodium Nitrite

The Business Magazine for Makers & Users of Chemicals
Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

Contents

Volume 50 Number 1

JANUARY, 1942

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Published monthly, except twice in October, and entered as 2nd class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, Domestic, $3 a year; Canadian and foreign, $4. Single copies, 35 cents. 522 Fifth Avenue, New York, N. Y., Murray Hill 2-7888; Horace T. Hunter, President; John R. Thompson, Vice-President and Treasurer; J. L. Frazier, Secretary.

Offices

New York: 522 Fifth Avenue, Murray Hill 2-7888
Chicago: 309 West Jackson Boulevard, Harrison 7890
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London: Quadrant House, 55-58, Pall Mall, London, S. W. I., Whitehall 6642

ABC

The Reader Writes—

Well, It Was Near Christmas

The Buyer's Guidebook Number arrived this morning. Thanks very much as I consider it quite a "gift" to include with a subscription. You are to be congratulated.

MILDRED PFISTER,
Consulting Engineer,
Cincinnati, Ohio.

Likes Equipment Section

I wish to congratulate you on the 17th Annual Revision of your CHEMICAL INDUSTRIES Buyer's Guidebook Number. The addition of an equipment section is a definite improvement and very helpful.

I wish to take this occasion also to commend you on the great improvement you have made in your magazine in the last three years.

FREDERICK A. HESSEL,
President, Montclair Research Corp.,
Montclair, N. J.

Guidebook At Work

Although we have your periodical, CHEMICAL INDUSTRIES, available for your students, I have considerable use for an extra copy of the Buyer's Guidebook Number. This is for a class of some 150 students in a course in chemical engineering who are later going to be interested in the kind of material you include. I send these men to the library for assignments, the material for which is partly available in this Guidebook. For this reason it is quite desirable for me to have a copy in my office to help the students and to check assignments with them.

If possible, therefore, I should like to buy a copy of the Guidebook (1941-1942) for my personal use in teaching this literature course. Nearly every day at present I am using the copy which you sent me last year.

M. G. MELLON,
Professor of Analytical Chemistry,
Purdue University,
Lafayette, Ind.

Wrong Patent Number

Just one of those little slips that will occur in the best-organized concerns. In the yellow supplement of CHEMICAL INDUSTRIES for November, 1941, page 748, you list a patent under the heading "Coatings." This patent is entitled "Method of Anchoring Thermoplastic Coatings." There is a very factual abstract of the patent but unfortunately the wrong patent number is attached. Instead of being No. 2,258,435, this should be No. 2,258,434, since the latter patent was taken out in our names and assigned to the Marathon Paper Mills Co.

I just felt that you would want to have this correction for your records.

ALLEN ABRAMS,
Vice-President,
Marathon Paper Mills Co.,
Rothschild, Wisc.

Tip From Abroad

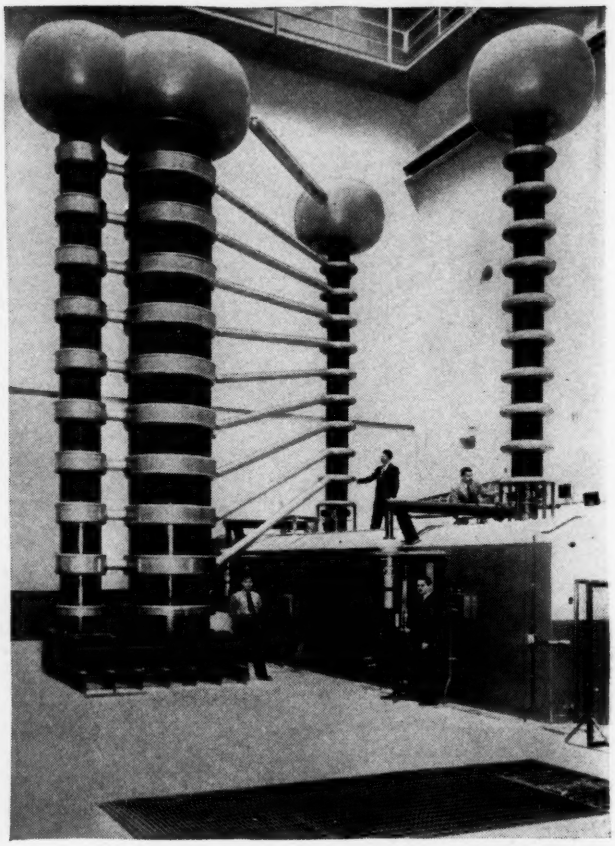
I find that CHEMICAL INDUSTRIES—the whole journal—is interesting and I believe you are "hitting the bull's-eye." As a matter of general comment the writer doubts the wisdom of the policy of giving specific information as to location and indications of size of plants specifically devoted to war purposes. The information may be contained in the daily press, but it must have more authority in a journal such as yours.

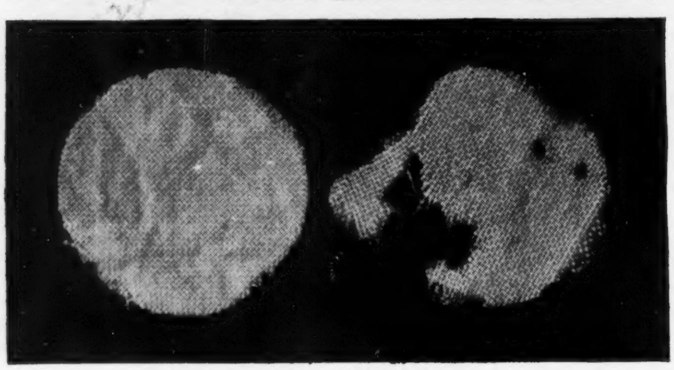
E. S. HEAREN,
Director,
British Cellophane, Ltd.,
England.

CALENDAR OF EVENTS

Jan. 17, Chicago Paint, Varnish and Lacquer Assn. Ladies' Night.
Jan. 21, Symposiarchs, Chemists' Club, N. Y.
Jan. 22, N. Y. Section, American Institute of Chemical Engineers, Chemists' Club.
Jan. 23, N. Y. Section, AATC&C, Chemists' Club.
Jan. 26, Assn. of Consulting Chemists and Chemical Engineers, Inc. The Chemists' Club, N. Y. C.
Jan. 26, St. Paul-Minneapolis Paint, Varnish & Lacquer Ass'n, Monthly Meeting, Town and Country Club, St. Paul, Minn .
Jan. 30, Akron Rubber Group, Akron City Club, Akron, O.
Feb. 5, Indianapolis Paint, Varnish & Lacquer Ass'n, Columbia Club, Indianapolis, Ind.
Feb. 9, Joint Meeting, N. Y. Section, American Institute of Chemical Engineers and Junior Chemical Engineers, Childs Restaurant, 109 W. 42 St., N. Y.
Feb. 9-12, American Institute of Mining and Metallurgical Engineers, Inc., Annual Meeting, Institute headquarters, 29 W. 39th St., New York, N. Y.
Feb. 11, Gypsum Association, Annual Meeting, Bismarck Hotel, Chicago, Ill.
Feb. 13, American Institute of Chemists, New York Section, The Chemists' Club, New York, N. Y.
Feb. 15-19, National Electrical Manufacturers Ass'n, Mid-Winter meeting, Chicago, Ill.
Feb. 16-19, Technical Assoc. Pulp & Paper Industry, Annual Meeting, Commodore Hotel, New York, N. Y.
Feb. 16-20, American Paper and Pulp Association, Annual Convention, The Waldorf-Astoria Hotel, New York, N. Y.
Feb. 19, New England Paint & Varnish Club, Hotel Vendome, Boston, Mass.
Feb. 23, Assn. of Consulting Chemists and Chemical Engineers, Inc., The Chemists' Club, New York City.
March 5, Indianapolis Paint, Varnish & Lacquer Ass'n, Columbia Club, Indianapolis, Ind.
March 12, Chicago Paint, Varnish & Lacquer Assn.
March 12, Drug, Chemical and Alied Trades Section, New York Board of Trade, Inc., 17th Annual Drug, Chemical & Allied Trades Banquet, Hotel Waldorf-Astoria, New York, N. Y.
March 14, Chicago Paint, Varnish & Lacquer Assn.
March 19, New England Paint & Varnish Production Club, Hotel Vendome, Boston, Mass.
March 20, Akron Rubber Group, Akron City Club, Akron, O.
March 23, American Institute of Laundering, Annual Board Meeting, Joliet, Ill.
March 30, Assn. of Consulting Chemists and Chemical Engineers, Inc., The Chemists' Club, New York City.
Apr. 2, Indianapolis Paint, Varnish & Lacquer Ass'n, Columbia Club, Indianapolis, Ind.
Apr. 9-10, American Water Works Association, Indiana Section, Purdue Memorial Building, Lafayette, Ind.
Apr. 14-17, American Management Association, Packaging Conference & Exposition, Hotel Astor, N. Y.
Apr. 15-17, American Water Works Association, Canadian Section, Niagara Falls, Ontario, Canada.
Apr. 15-17, National Wholesale Druggists' Ass'n, Spring Meeting, Palmer House, Chicago, Ill.
Apr. 15-18, The Electrochemical Society, Inc., Electric Furnace & Corrosion Convention, Nashville, Tenn.
Apr. 16, New England Paint & Varnish Production Club, Hotel Vendome, Boston, Mass.
Apr. 16-17, National Petroleum Association, Cleveland, Ohio.
Apr. 17, American Institute of Chemists, New York Chapter, Chemists' Club, New York, N. Y.
Wk. of Apr. 19, The American Ceramic Society, 44th Annual Meeting, Cincinnati, O.
Apr. 20-24, American Chemical Society Semi-Annual Meeting, Memphis, Tenn.
Apr. 20-22, American Water Works Association, Southeastern Section, Savannah, Ga.
Apr. 27, Assn. of Consulting Chemists and Chemical Engineers, Inc., The Chemists' Club, New York City.
May ? 1942, American Spice Trade Association, Inc. Annual Meeting.
May 4-7, American Drug Manufacturers Association, Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.
May 7, Indianapolis Paint, Varnish & Lacquer Ass'n, Columbia Club, Indianapolis, Ind.
May 7-9, American Water Works, Pacific Northwest Section at Marcus Whitman Hotel, Walla Walla, Wash.
May 11-13, American Institute of Chemical Engineers 34th Semi-Annual Meeting, Boston, Mass.
May 11-15, National Electrical Manufacturers Ass'n Spring Meeting, Hot Springs, Va.
May 12-13, The Associated Cooperage Industries of America, Inc. Annual Convention, Jefferson Hotel, St. Louis, Mo.
May 15-16, American Water Works Assoc., Ohio Section, Toledo, O.
May 18-20, Flavoring Extract Manufacturers' Assoc. 33rd Annual Convention, Hotel Pennsylvania, New York, N. Y.
May 18-22, American Association of Cereal Chemists, Annual Convention, Edgewater Beach Hotel, Chicago, Ill.
May 21, New England Paint & Varnish Production Club, Hotel Vendome, Boston, Mass.
May 22, American Institute of Chemists, New York Chapter, Annual Meeting, Chemists' Club, New York. N. Y.
May 25, Assn. of Consulting Chemists and Chemical Engineers, The Chemists' Club, New York, N. Y.
May 25-28, National Association of Purchasing Agents National Convention and Inform-A-Show, Waldorf-Astoria Hotel, N. Y. C.
May 25-27, The American Leather Chemists Ass'n, Annual Meeting, The Sagamore Hotel, Bolton Landing, Lake George, N. Y.
May 26-28, National Lime Association, Annual Convention, The Homestead, Hot Springs, Va.
May 28-29, Tanners' Council of America, Spring Meeting, White Sulphur Springs, W. Va.
June 1-3, Scientific Apparatus Makers Ass'n.
June 8-10, The National Fertilizer Association, 18th Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va.
June 8-11, American Electroplaters' Society, Annual Convention, Pantlind Hotel, Grand Rapids, Mich.
June 18, New England Paint & Varnish Production Club, Hotel Vendome, Boston, Mass.
June 21-25, American Water Works Association, Annual Convention, Stevens Hotel, Chicago, Ill.
June 22-26, A.S.T.M. 45th Annual Meeting, Chalfonte Haddon Hall, Atlantic City.

LIFE ON THE CHEMICAL NEWSFRONT



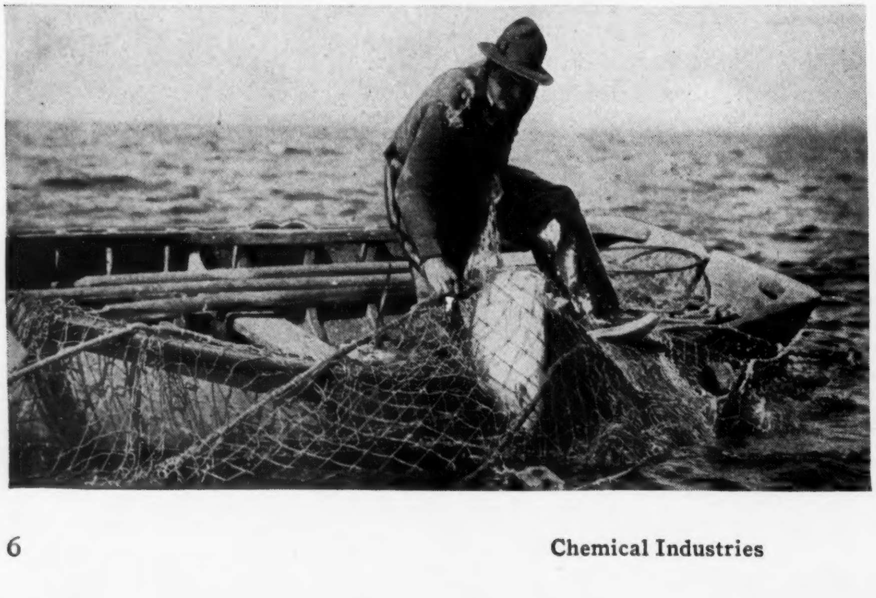


(*Above*) **WORLD'S MOST POWERFUL X-RAY MACHINE** has been put into service at the recently completed high voltage laboratory of the National Bureau of Standards in Washington. With columns more than 30 feet high, the machine is said to have an X-radiation capacity roughly equivalent to that of 14 pounds of radium (if such a quantity could be obtained).

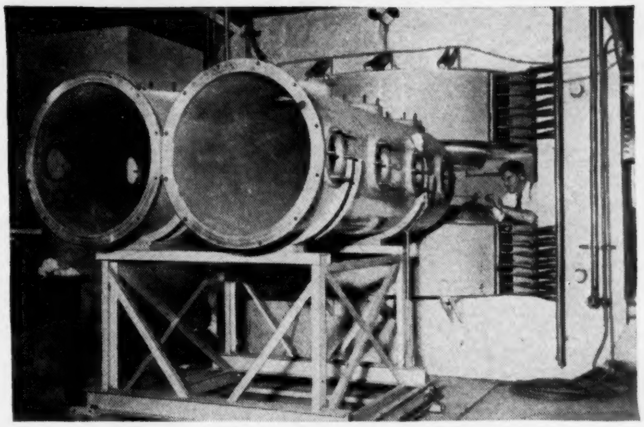
(*Left*) **GOOD NEWS FOR WOOLENS.** By breaking down molecular structure of wool with thioglycollic acid and reconstructing it with methyl or ethyl dibromide, National Bureau of Standards reports wool is mothproofed (note treated and untreated samples), made less sensitive to soaps and less likely to shrink. Cyanamid contributes to better wool with scouring, garnetting, lubricating, fulling, dyeing and carbonizing agents.

(*Below*) **FOR PRESERVING FISH,** crushed ice containing as little as 0.1% sodium nitrite has been found to be remarkably potent. This chemical is claimed to greatly retard bacterial spoilage of fish without impairing color, odor or flavor. For preserving filets, five minute immersion in brine containing 0.1 to 0.6% sodium nitrite is reported effective.

(*Below*) **"CHEMICALLY FIRED STOVES"** to heat "iron rations" for U. S. Army parachute troops are being issued. The folding stove burns small chemical tablets.

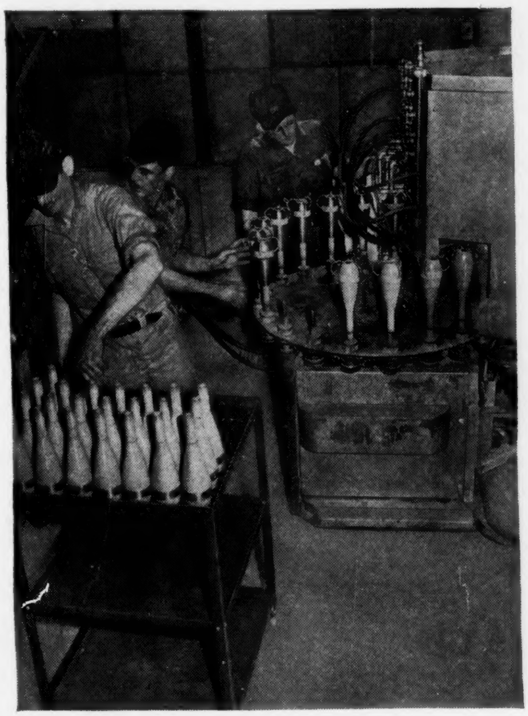


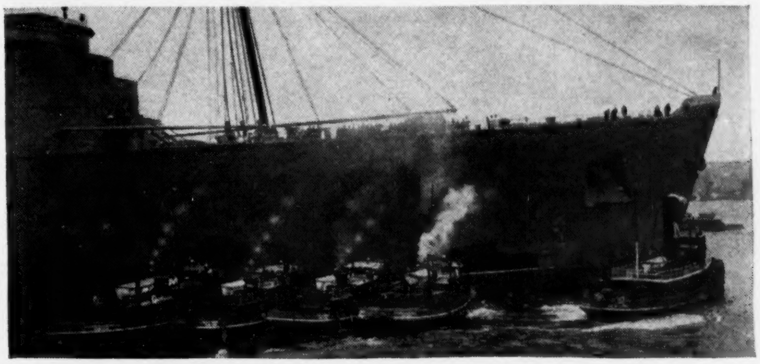
(*Above*) **SELF-DISINFECTING DRINKING GLASSES,** developed by Dr. Alexander Goetz and co-workers at California Institute of Technology, are expected to be important in curbing communicable disease. A plastic-silver mixture, used to coat the rims of glasses and other containers, is said to kill practically all liquid-borne bacteria.



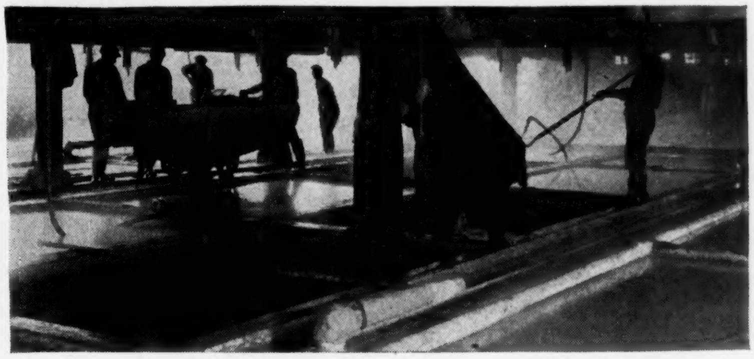
(*Above*) **"BLITZKRIEG" ON ATOMS.** This 80-ton cyclotron is being constructed at the University of Illinois under the supervision of Professor J. R. Richardson. The cylinders will provide an air-tight passage for electrodes going into the vacuum chamber between the poles of the huge electromagnet.

(*Below*) **SHELLS FOR VICTORY.** In this factory, typical of many others throughout the country, 81-millimeter mortar shells are being turned out 24 hours a day to meet the new demands of Uncle Sam's wartime requirements. The machine shown sprays black paint inside and yellow quick-drying lacquer outside the shell. Important ingredients in such coatings are American Cyanamid's AERO* Brand Nitrocellulose as well as plasticizers and synthetic resins.





(*Above*) **"VISIBLE WHISTLES"** that can be understood despite wind or noise have been developed by emitting visible puffs of aluminum stearate. A Cyanamid product, aluminum stearate is chiefly used for cosmetics and lubricants.



(*Above*) **FROM RAW HIDES TO FINISHED LEATHER,** such products and specialties of American Cyanamid as DEPILIN* Unhairing Agent, CUTRILIN* and KERALIN** Bate, and TANAK* Synthetic Tanning Material play an important part. Write for information.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

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*Reg. U. S. Pat. Off.

Washington

By

T. N. SANDIFER

OUTBREAK of a shooting war between the United States and powerful adversaries on the other side of both oceans washing the coasts of the United States has made academic many of the considerations that ordinarily crop up this time of year when new legislation is being shaped in conferences between Administration and Congressional leaders.

It is foregone that there will be extraordinary tax proposals, and enactment, doubtless, of tax measures that in other than war would have no chance. It is foregone likewise, that ordinary industry, already bewildered by the maze of regulations emanating from Washington, is going to be subjected to further curtailments, deprivations, restraints, and shake-ups in normal routine. For the moment there is no challenge in Washington of any proposal that bears on the promise of conducting a successful war.

T. N. Sandifer

There is a cheering note to the extent that the concern of small business, already feeling the crush of forces all around it, is still in the hands of some members of Congress, and is receiving lip-service at least, around OPM. A Senate committee of which Senator Murray, Dem., of Oklahoma, is chairman, has held hearings the past several weeks, endeavoring to find some solution to the problems involved in keeping smaller firms alive.

Floyd Odlum, director of the division of Contract Allocation of OPM, told a closing session, "Give me one-half of one per cent. of the raw materials available, and I'll preserve 90 per cent. of small business."

Finding even that infinitesimal amount of material, not already ear-marked, is becoming increasingly difficult however. And the continued failure to provide it, according to Mr. Odlum's own admission, forecasts "terrific business mortality" in the coming month or two. He has pleaded that his job has entailed "responsibility without power" which certainly is not a new complaint around Washington.

Whatever the reason for the situation, if it materializes as predicted, it is generally known, and admitted privately, that some phases of the contract allocation system have failed. The procedure envisioned for this plan was for reports to be made in distress cases involving firms threatened with extinction because confined to peace-time activity; this report would be acted on at Washington by passing it, after due consideration, to those having war contracts to pass out, with the expectation that the latter authorities would act on the recommendations in question and supply a life-giving contract to the plant, or basic industry in the community. It has not worked that way.

A very large proportion of reports of distress plant cases have led to only a thin trickle of certifications, and not then, in every case, to the necessary contract. The Washington maze is too complicated for any such program to work that way. It is known that efforts are being made to remedy the more glaring defects in the plan, but whether these corrections will be in time this coming critical period is a guess.

Meantime the Senate committee has weighed a number of such points, and its report is expected to be made in an early part of the year, with the prospect that the strong interest in the whole problem in Congress may produce some results.

The nation's gigantic whiskey distilling industry will shortly feel the full impact of war, with results that may be far-reaching. As this is written, and probably before it appears, a series of drastic orders are in the making for early publication, putting this distilling industry into war production of additional supplies of munitions alcohol, placing drastic restrictions around the use of high-test molasses, and conversion of sugar into this substance, and diverting present quantities of alcohol ordinarily used for manufacturing blended whiskey, to munitions. The immediate effect on the nation's supply of potables will not be apparent because of the very large reserve of upwards of half-a-billion gallons which can be used to tide over.

However, there will probably be issued shortly some three orders putting into effect the program roughly outlined here. From this outlook it is easy to deduce that there will be still further restrictions on chemicals, including alcohols, going into ordinary civilian uses. The trend is apparent in some of the more noteworthy orders by the various emergency regulatory bodies in Washington to date.

Under an amendment to General Preference Order M-34 all toluene becomes subject to allocation beginning February 1. Associated usually with explosives production, the order provides that on this date at least 70 per cent. of the total production by all toluene producers must be of nitration grade meeting the Army's Grade A specifications.

Besides its better known use in TNT however, this chemical is a component of food preservatives, medicinals, drugs, oil additives, as a solvent for quick-drying coatings, in dyes, and a multitude of other products.

Effective immediately, and expiring unless renewed, on January 31, 1942, General Preference Order M-71 places some type of fats and oils under controlled delivery for this period, to conserve the supply and control distribution under present conditions. The order affects "all raw, crude and refined fats and oils, their by-products and derivatives and greases" except certain "essential oils" which are excluded, and which latter class numbers such products as lemon, orange, camphor, citronella, clove, dill, eucalyptus, lime, mustard, pennyroyal, peppermint, wintergreen, and pimento. Also excluded are sales of fats and oils in finished product form, and of refined edible fats and oils, except olive oil, through wholesale and retail channels and directly to cooking trades. However, soaps and paints will be largely affected by the order, using many of the materials under restriction.

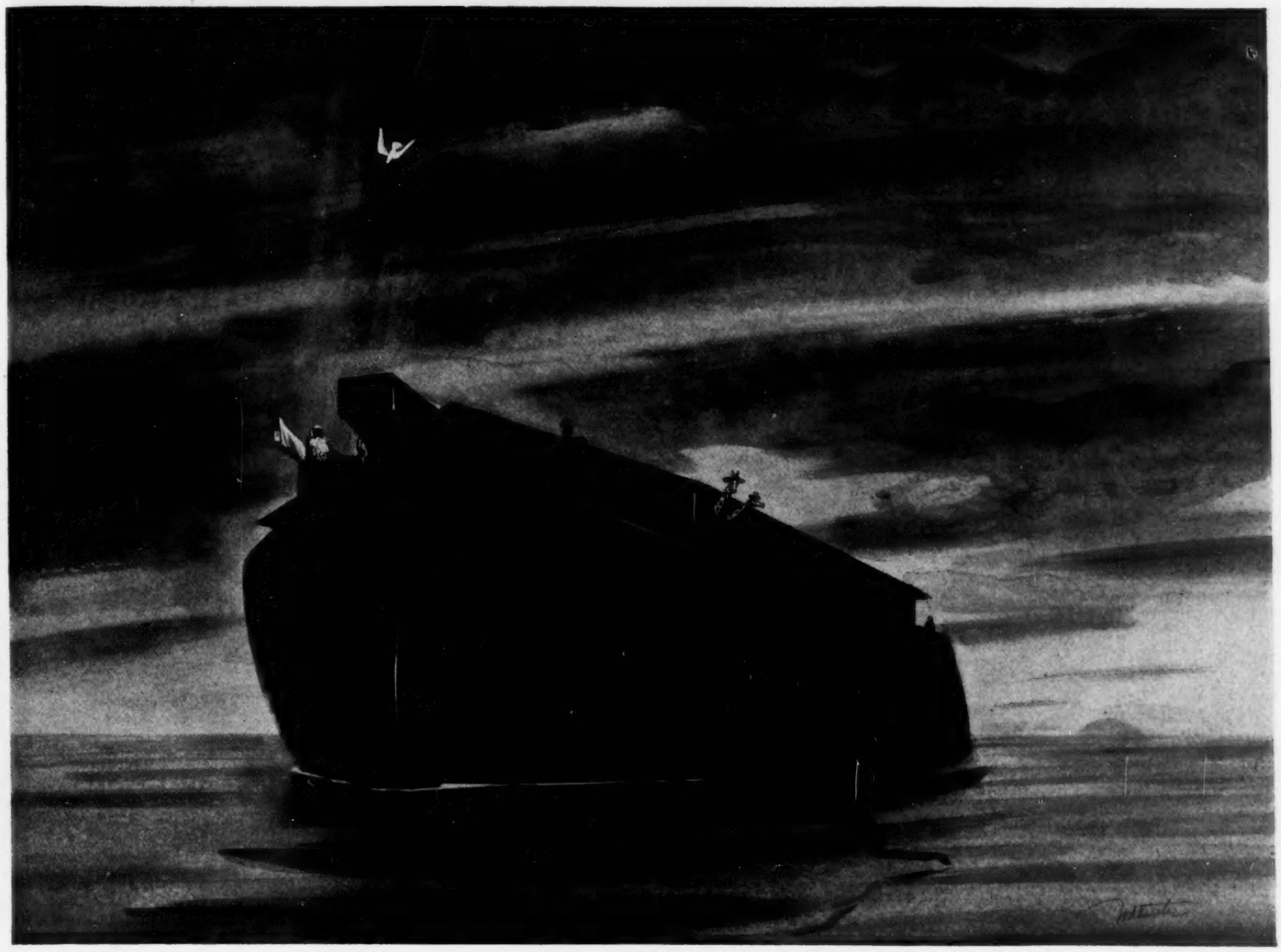
The lead foil and tin foil order, L-25, which will likewise have repercussions in certain manufacturing fields, is temporarily in abeyance, but only because it will be incorporated in a very drastic order covering tin, generally, and which is due out probably before this appears.

Producers, jobbers, refiners, and dealers in glycerine have been asked to restrict shipments except for direct defense requirements and to prevent a plant shutdown. Other actions in brief, to date, include the following:

Price ceiling raised by OPA to facilitate increased production of acetone, butanol, and ethyl alcohol from corn; Limit removed, under amendment to General Preference Order M-31, on amounts of methyl alcohol which may be delivered for use as a denaturant for ethyl alcohol, for production of formaldehyde, and for general chemical manufacture; Priority rating A-10 granted manufacturers of insecticides, germicides and fungicides by Preference Rating Order P-87; Authorization of

(*Continued on page 85*)

FROM THE ORIGINAL, PAINTED ESPECIALLY FOR NIAGARA ALKALI COMPANY BY FRED FREEMAN



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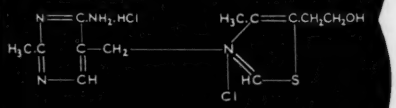
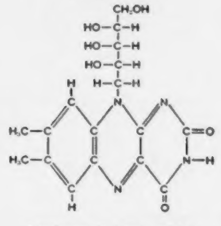
MERCK PURE VITAMINS

THIAMINE HYDROCHLORIDE MERCK (U. S. P.)



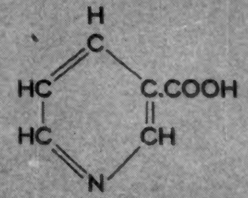
Synthesized in the Merck Research Laboratories in 1936. Made available in 1937

RIBOFLAVIN MERCK



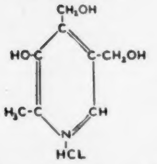
Made available in 1938.

NICOTINIC ACID MERCK (U. S. P.)



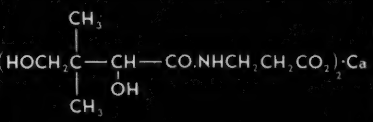
Made available in 1938. Nicotinic Acid Amide Merck was also made available in that year.

VITAMIN B_6 HYDROCHLORIDE MERCK



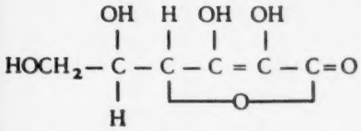
Synthesized in the Merck Research Laboratories in 1939. Made available in 1940.

CALCIUM PANTOTHENATE DEXTROROTATORY MERCK



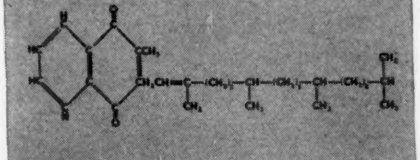
Identified and synthesized by Merck chemists and their collaborators in other laboratories in 1940. Made available during the same year.

ASCORBIC ACID MERCK (U. S. P.)



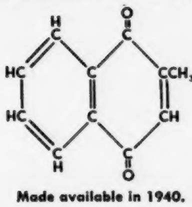
Made available in 1934.

2-METHYL-3-PHYTYL-1, 4-NAPHTHOQUINONE MERCK (Vitamin K_1)



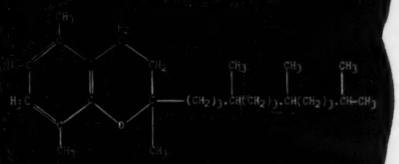
Made available in 1940.

2-METHYL-1, 4-NAPHTHOQUINONE MERCK (Vitamin K Active)



Made available in 1940.

ALPHA-TOCOPHEROL MERCK (Vitamin E)



Made available in 1940.

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The identity of pure vitamins produced by chemical synthesis and pure vitamins derived from natural sources—in chemical composition, physiologic function, and physical characteristics—is definitely and authoritatively established.

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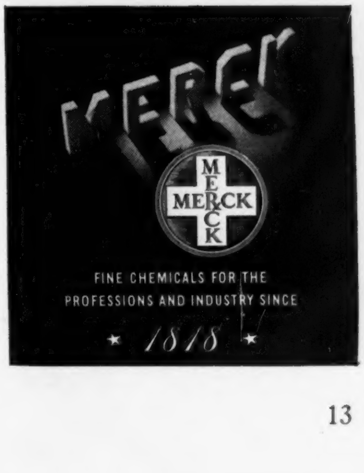

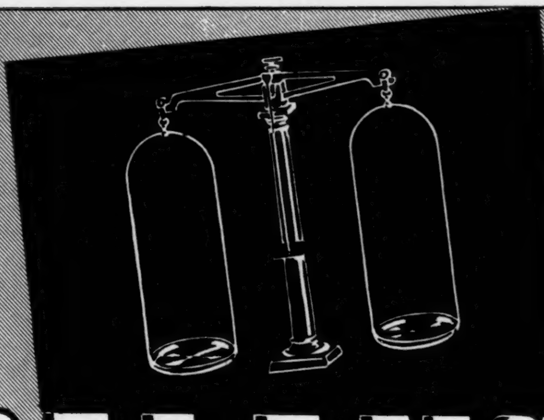

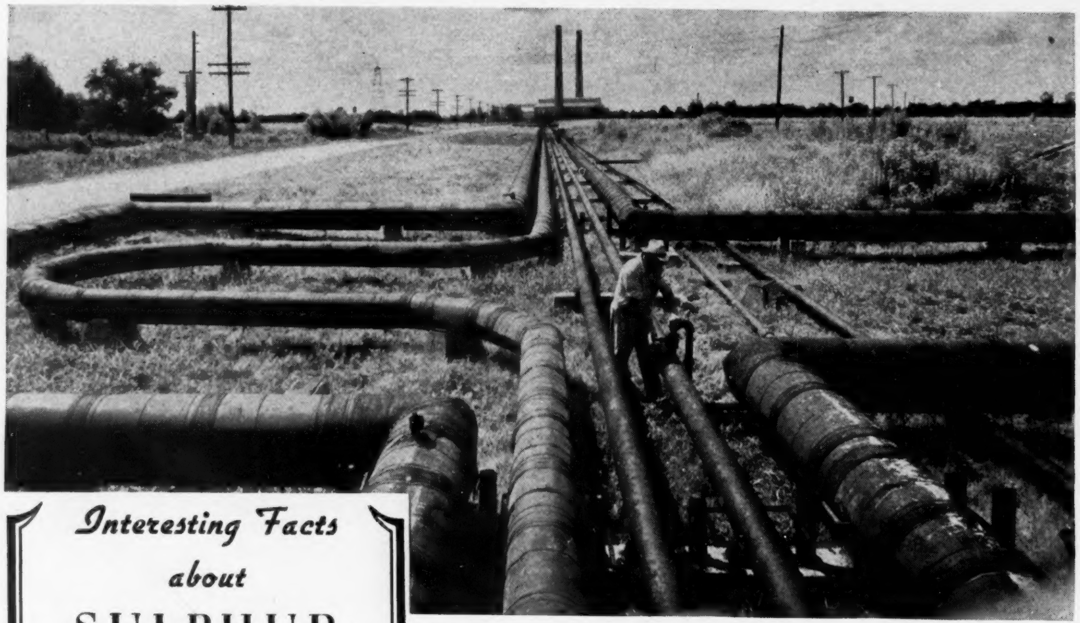

1941 1942

CHEMICAL INDUSTRIES

Buyer's Guidebook Number

Introduces on page 537 an Equipment and Container Buying Directory. The new section, initiated at the request of many regular GUIDEBOOK users, rounds out a valuable reference work for buyers, chemists and chemical engineers. The BUYER'S GUIDEBOOK NUMBER is now the ONE place where the purchasing, research and engineering departments can go for extensive commercial and technical information and sources of supply for chemicals, raw materials, chemical specialties, equipment and containers. It puts between the covers of ONE book the information that would ordinarily require several references. It therefore becomes the handy guide which is kept on the buyer's desk.

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CHEMICAL INDUSTRIES

522 Fifth Avenue — The Chemical Business Magazine — New York, N. Y.

The NITROPARAFFINS offer new opportunities for Chemical Exploration

Like the unexplored tributaries of a great river, the Nitroparaffins ... Nitromethane, Nitroethane, 1-Nitropropane, and 2-Nitropropane ... offer countless channels for exploration and discovery. And each new channel ... each new derivative ... opens rich, fertile fields to the chemical explorer.

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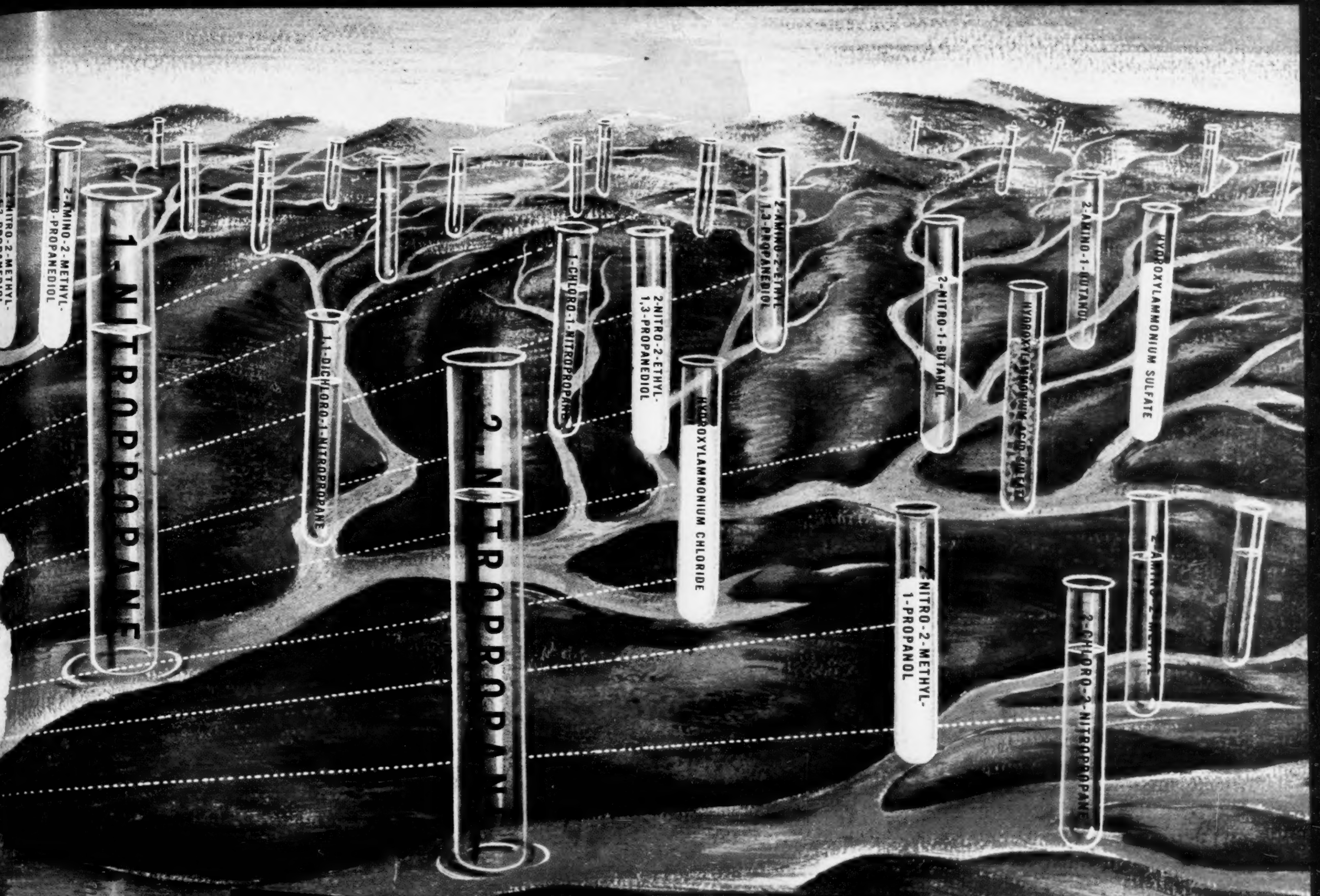

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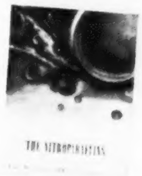
of a great Chemical Discovery

"The most important advance in Chemistry since the Development of the Coal Tar Derivatives"

Seventy years ago, the *coal tar* family showed remarkable promise. Every chemist knows the rich rewards reaped by the research workers who developed those new products. Today the *Nitroparaffin* family offers comparable opportunities. New products . . . improved processes . . . lower costs . . . personal achievement . . . those will be the rewards of creative chemists with the vision and foresight to investigate *now* the Nitroparaffins and their derivatives.

WRITE FOR NEW BOOKLET

"The Nitroparaffins—New Worlds for Chemical Exploration"—40 pages of new and useful technical information about the NP's.



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The Situation in Rubber

TURNING the pages of last year's issues of Chemical Industries while preparing the "Chemical Chronology, 1941," the following sentence which appeared in the January number seems to have been quite prophetic—"The problem of quickly developing a synthetic rubber industry assumes a major place in America's defense plans."

Sudden and undeclared war in the Pacific has focused the whole nation's attention on the critical situation in rubber. The United States normally obtains approximately 97 per cent. of its crude rubber from Far Eastern areas at a cost of about $150,000,000 annually. Our requirements of crude in the last few years have totalled around 600,000 tons and if greatly expanded military needs are superimposed upon normal peacetime requirements the figure would easily reach 800,000 tons or more. With but a stockpile of 600,000 tons available, including some 125,000 at the moment in transit, it is perfectly obvious that America must ration

CHEMICAL INDUSTRIES

severely over the next two years. Very rightfully the government has moved promptly to put into operation ways and means of distribution, but voluntary action on the part of each and every one of us can aid materially in meeting the crisis. It is the very least we can do to avenge Pearl Harbor, Wake Island and the terrible punishment which the Philippines is taking so courageously at the moment. Let us walk often instead of driving. It is one personal sacrifice we can make that will help rather than hurt our physical well-being, yes and probably our spiritual well-being as well. It is a time of supreme personal sacrifice not one for joyriding.

The situation is not, however, without its bright side. Within the last six months we have made rapid strides in the synthetic rubber field with important additions to synthetic plants already in existence. Four new synthetic plants are in the course of construction. It is expected that by the end of 1942 we will be producing at least 70,000 tons synthetically which should go quite a ways toward meeting the requirements of our war machine. This figure, of course, does not include the possibilities of further immediate expansion of our synthetic rubber production program as outlined on December 23rd when the SPAB announced approval of plans to triple the existing facilities subject to detailed examination of the program by the Division of Priorities in order to make certain that sufficient materials can be provided for construction and operation of the new plants. The total synthetic program, providing an immediate start is made on the proposed plants, will give us an output of some 120,000 tons of synthetic rubber early in 1943. Even this is somewhat short of the $100,000,000 program advocated by Dr. Harry N. Holmes, head of the Department of Chemistry of Oberlin College and the new president of the American Chemical Society, in his New Year's message to the Society's members.

Nor does this exhaust all the possibilities. Harvey S. Firestone has reported that there is approximately a million tons of scrap rubber available for emergency use. Rubber from guayule is now receiving belated interest from federal agencies, and the Farm Research Council has put forward the idea of cultivating a rubber-bearing dandelion plant technically known as "Kok-sagyz." Just how much the latter two, guayule and kok-sagyz, can contribute is problematical, nor can we hope for much in the way of supplies of crude rubber from South America at least through 1942.

The rubber problem then is largely a problem that the chemical industry will have to meet and solve. Looking at it from a long-range viewpoint the existing emergency may be a distinct blessing in disguise for out of it probably will come the necessary impetus to erect in this country a synthetic rubber industry that will release us for all time from any dependence upon foreign sources of supply of natural rubber; certainly it will place a ceiling on prices of the natural and will prevent any recurrence of the price speculation of the early twenties.

Readers of Chemical Industries are particularly fortunate this month in being provided with such an authoritative discussion of the entire subject as Dr. William C. Geer gives in his article "Elastomers in the Nation's War Program" (page 22). The editors wish to publicly acknowledge their indebtedness to Dr. Geer for his willingness to revise the manuscript in the light of the happenings of the last two weeks.

CI
The Chemical Business Magazine. Established 1914

Walter J. Murphy, Editor

Women in the Chemical Industry: While no serious shortage of skilled or unskilled male labor exists at the moment in the chemical field it is important for management to bear in mind that expansion in producing capacities plus a possible expansion in our armed forces to four or five million men may very well create a situation where it will become necessary to employ women in plant work.

The industry and particularly the heavy chemical division normally offers very little opportunity for the employment of female help, but just because it has not been desirable in the past to employ women is no legitimate reason why such an expedient cannot be turned to in a serious emergency.

The recent memorandum entitled "War-time Employment of Women in Chemical Industry," published by the British Ministry of Supply (Chemical Control Board) and prepared as a result of a special inquiry undertaken among members of the Association of British Chemical Manufacturers with the co-operation of Imperial Chemical Industries, contains some very excellent suggestions based, of course, on the practical experiences of producing companies. Readers will find in this issue, page 97, a very excellent digest of this memorandum reproduced from the British "The Chemical Trade Journal and Chemical Engineer" (Nov. 21 issue).

It is specially noteworthy that all groups—employers, employees, labor leaders and the government—cooperated closely and effectively in working out details of the plan whereby larger numbers of female help could be employed efficiently in the chemical industry.

The Speed Up in War Industries: One cannot go through the "Chemical Chronology, 1941," page 38, without being impressed greatly with the volume of new construction of chemical and metallurgical plants that has taken place in the last twelve months. While much of such construction is not completed, there is little doubt about America being an effective "Arsenal of Democracy" by the end of 1942, and possibly sooner.

With still a large part of our war production capacities yet to be actually contributing in the way of maximum output it is encouraging to read that William P. Witherow, Blaw-Knox president, and newly elected president of the National Association of Manufacturers, believes that American industry during 1941 produced as much or more essential war material than did Germany and the Axis countries combined. This production, according to Mr. Witherow, included all of the essentials for a successful military campaign—airplanes, automobiles and trucks, tanks, machine tools, steel, electric power and petroleum. In military planes alone our output is reported by the new NAM president to have totalled 20,000—equal to the best estimates made of what Germany turned out in the like period.

While this is all very encouraging it should not become the basis of any false optimism. Whether or not it will be ultimately necessary to go as far as the President recently intimated of spending at the rate of fifty billion dollars annually on the war program—remains to be seen, but the only way to go at it now is with the complete determination that such amounts or even more will be spent willingly and intelligently to bring the Axis powers to their knees.

Celebrating Company Birthdays: With the Nation now at war it would seem at first blush that anything more than just passing reference to an individual's birthday or a company's birthday would be unnecessary. Yet such occasions should not go unnoticed and, in the case of companies, unpublicized, for they are very often symbols of that which we are striving with might and main to protect—the right of the individual to life, liberty, pursuit of happiness and an opportunity to work not as a slave but as a free man with unlimited opportunity to reach a personally pre-determined goal.

A few months ago a brochure appeared on the editorial desk with this very simple statement on the cover and nothing else—"A Century Ago Two Men Started A Coppersmithing Business And Soon Took On A Boy As An Apprentice . . . This Is His Story." Aside from a natural editorial interest in such a splendidly conceived typographical presentation, celebrating the one hundredth year milestone in the history of E. B. Badger & Sons Co., Boston, aside from the historical interest the brochure possesses, containing as it does largely excerpts from the "Memoirs" of Erastus Beethoven Badger, the birthday booklet unconsciously instills in the reader a greater appreciation of the "American Way of Life."

Here in simple language is the story of a boy who started as a "bound-out apprentice" and in time became the sole owner of a greatly expanded business; who after a long and useful life was able to pass on to his sons and their heirs a valuable property; it is the story of a man who laid such a firm foundation that one hundred years after its birth his company is active in the service of industry and country.

Yes, indeed, company birthdays are worth more than just a fleeting moment of comment. It is particularly important in the chemical field for some of our friends who make up the general lay-public still look upon our industry a bit as an up-start, as a callow fledgling, somewhat on the immature side and, therefore, lacking an appropriate sense of proper responsibility and respect. It is nice to be able to point out, for example, that Philadelphia Quartz celebrated its 110th birthday last year, that Michigan Alkali was fifty years old in 1940 and that Mathieson Alkali will celebrate a similar milestone next month. Yes, we have both youth and a dignity of age that collectively we are proud of. Is it not a very unique combination?

Need for Economy Urgent: Events of the past few weeks have strengthened if anything the logic of urging economy on the Administration in Washington. This very moment is the opportune time for you to urge your representatives and senators to give support to the recommendation of the Joint Congressional Committee on Non-essential Expenditures, headed by Senator Byrd of Virginia, that a saving of $1,716,965,061 be made during the coming fiscal year by specific slashes in nondefense governmental outlays. Write or wire today. And if you are at all interested in such economies (and who shouldn't be?) send for "Curtailment of Non-Defense Expenditures," by Henry P. Seidemann, published by The Brookings Institution, Washington, D. C., price, twenty-five cents per copy. This study only released December 29, 1941 will supply you with plenty of ammunition.

No. 3 in a series of advertisements about new research chemicals.

Announcing 4 Newcomers for Laboratory Study

N-ETHYL MORPHOLINE
ACETOACET-O-TOLUIDIDE
DIMETHYLETHANOLAMINE
"CELLOSOLVE" BENZYLOXYGLYCOL

HERE are four new synthetic organic chemicals available in research quantities. They should be of special interest if you make emulsions, dyestuffs, pharmaceuticals, or rubber accelerators . . . if you use solvents for lacquers, dyestuff pastes, printing inks, or coating compositions . . . or if you can develop new products and processes using synthetic organic chemicals.

These chemical newcomers were synthesized in our laboratories, and the supply is limited. However, commercial quantities may be made available in the future when large-scale applications develop. Write for quotations.

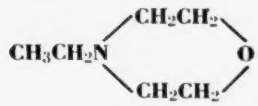
For information concerning the use of these chemicals, address:

Carbide and Carbon Chemicals Corporation

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York, N. Y.

N-ETHYL MORPHOLINE



. . . is a colorless, water-miscible liquid boiling at 138°C. This cyclic tertiary amine is potentially useful as a solvent for dyes, resins, and oils, and as an intermediate in the manufacture of dyestuffs, pharmaceuticals, rubber accelerators, and emulsifying agents. Its molecular weight is 115.17; its specific gravity at 20/20°C., 0.916.

ACETOACET-O-TOLUIDIDE

$CH_3COCH_2CONHC_6H_4CH_3$

. . . is a fine, white, granular powder which melts at 106°C., and contains active methylene and carbonyl groups. It is very similar to acetoacetanilide and is also used as an intermediate in the manufacture of "Hansa" and "benzidine" pigments. It is slightly soluble in water and is soluble in dilute alkalies. Its molecular weight is 191.22.

DIMETHYLETHANOLAMINE

(Dimethylaminoethanol)

$(CH_3)_2NCH_2CH_2OH$

. . . is a colorless, amine-odored liquid which is miscible with water and benzene. Its properties are similar to those of diethylethanolamine (diethylaminoethanol) which has been used commercially for many years. It should be useful in the synthesis of dyestuffs, textile auxiliaries, pharmaceuticals, and corrosion inhibitors. Its physical properties include: boiling point, 133°C.; specific gravity at 20/20°C., 0.887; equivalent weight, 89; refractive index, 1.4300.

"CELLOSOLVE" BENZYLOXYGLYCOL

(Ethylene Glycol Monobenzyl Ether)

$C_6H_5CH_2OCH_2CH_2OH$

. . . has the high boiling point of 255.9°C., and its vapor pressure is about the same as "Cellosolve" Phenoxyglycol. It is well-suited as a high-boiling solvent in lacquers, dyestuff pastes, printing inks, and in coating compositions for paper, leather, and cloth. Its specific gravity at 20/20°C. is 1.0700. It is 0.4 per cent soluble in water.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

Elastomers in the NATION'S WAR PROGRAM

By William C. Geer, ***Former Vice-President in Charge of Research and Development of B. F. Goodrich Company***

Nothing could be more timely at this moment than an article on rubber. Here is a review of natural and synthetic elastomers in accordance with their physical properties and an outline of the uses to which they are put in the nation's great war effort.

THE rubber industry is afflicted by a confusion of terms. It has been perplexing enough to use such terms as pure gum, raw rubber, crude rubber, natural rubber and vulcanized rubber. Yet, even more uncertainty has been brought into the language coincident with the discovery of several varieties of synthetic products which possess some of the more obvious physical characteristics of natural and vulcanized rubber. Thus, synthetic rubber, rubber-like substances, artificial rubber, and so on, connote a series of substances, each different, none possessing all of the properties of either crude or vulcanized rubber, and each with a different trade name.

It would seem that some of the confusion may be avoided by the use of a new term to express a generic relationship between these several materials. That word is "elastomer" which was first proposed by Fisher.[1]

The elastomers include natural crude rubber, reclaimed rubber, and several types of product customarily known as "synthetic rubber." They are all thermoplastic in the raw or unmanufactured state. They need other substances mixed with them for the majority of uses. These mixtures must be processed hot to shape them into a desired form and, with two exceptions, each such compound must be heated to acquire improved properties and to render it non-thermoplastic and in condition for the consumer.

The term "elastomer" (and any term which indicates materials within this generic meaning) includes the materials in both the raw and finished state. It may be employed alone when the discussion is non-technical or statistical but whenever the physical or chemical properties are considered, the adjective "vulcanized" should be employed because properties of raw and vulcanized elastomers are notably different.

Rubber

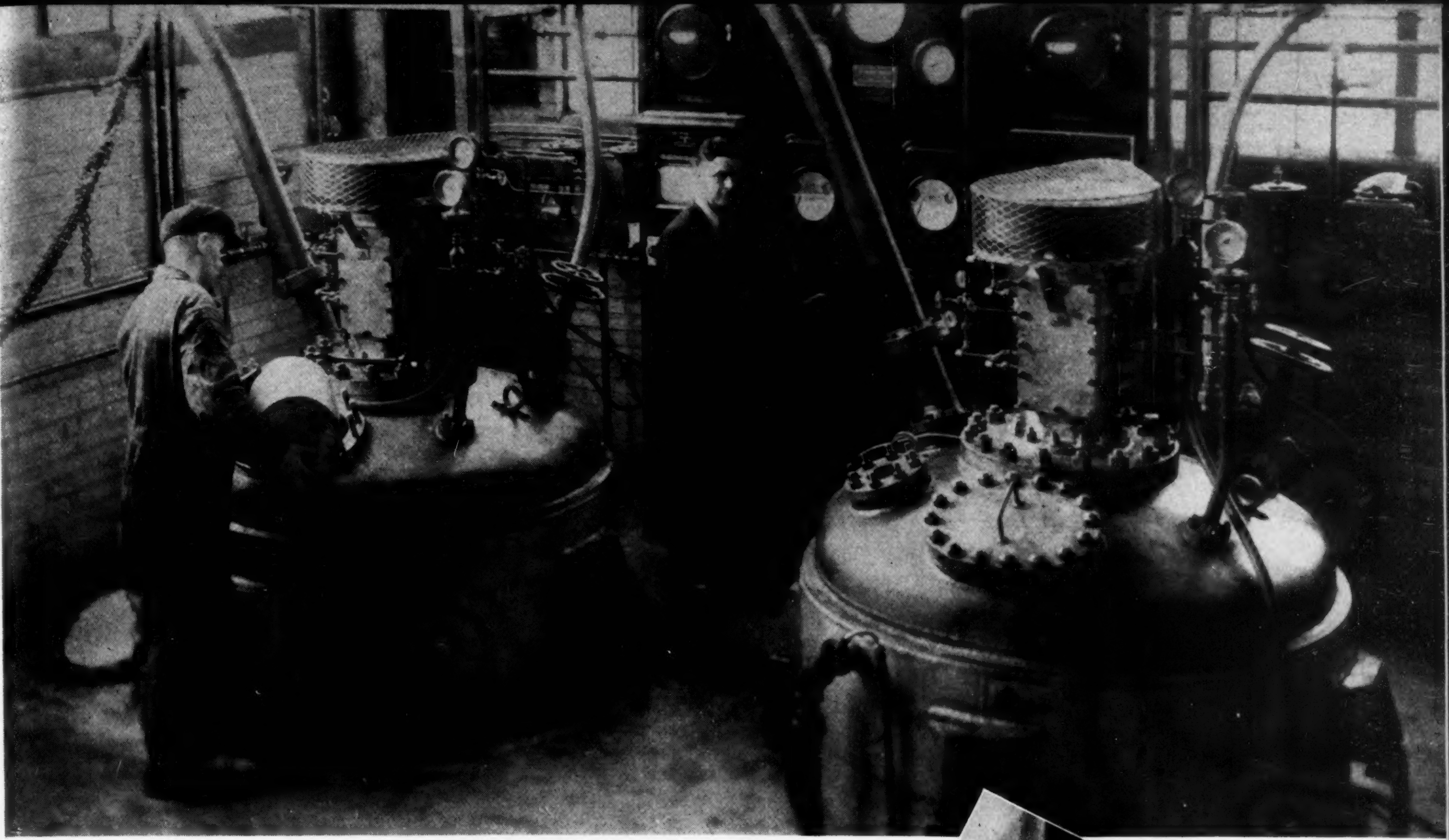
Little natural crude rubber is used as such. The rubber industry manufactures articles the chief component of which is the vulcanized rubber compound, "a mixture or dispersion of sulfur and one or several other ingredients into crude rubber, which after it has been heated or 'vulcanized' is found to have acquired changed and valuable physical properties ...... Crude rubber, its chief ingredient, is fundamental. When various substances are mixed with crude rubber in different proportions, there can be produced almost an infinite variety of vulcanized rubber mixtures, each with differing properties and each adapted to specific uses."[2]

Natural crude rubber is not a chemical individual. Over 91 per cent. of it is a hydrocarbon, in addition to which it embraces resins, proteins, and inorganic salts. No chemically identifying name for this hydrocarbon has ever gained general acceptance, although Fisher[3] proposed the word "polyprene." Because our interest is almost entirely in natural crude rubber rather than the hydrocarbon, it is well to adhere to the common term "rubber."

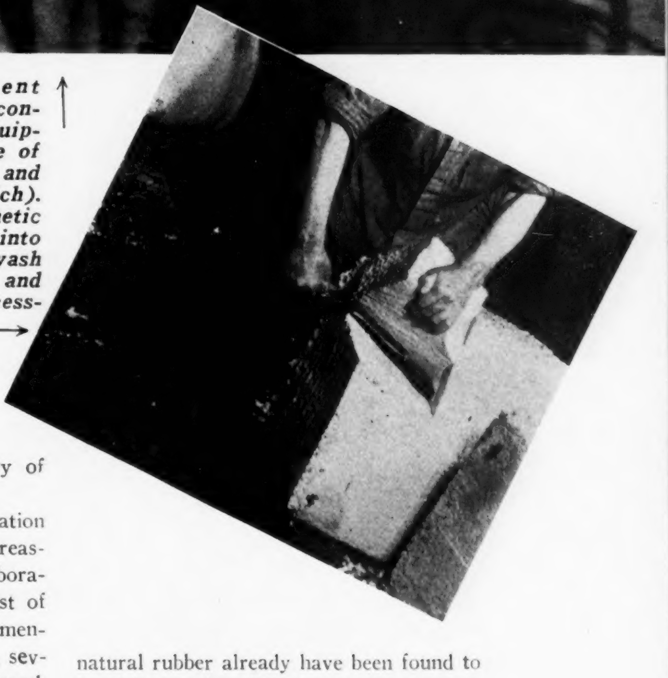
Many grades of crude rubber are known on the market. The Rubber Reserve Company[4] has recently listed 47 types and grades, and corresponding prices of them, which are available to the manufacturing industry. The rubber technician faced real complications in order to combine these 47 types and grades with each other, with a dozen grades of reclaimed rubber, the several thousands of different substances such as accelerators, antioxidants, rein-

Gun carriage equipped with the latest design rubber tires and bullet resisting tubes, "somewhere in the U. S. A."

Photo Courtesy Goodrich



Above, polymerization equipment showing two polymerizers with control panel in background. This equipment is used in the manufacture of synthetic rubber from butadiene and other ingredients. (B. F. Goodrich). Right, cutting blocks of raw synthetic rubber (Goodrich's Ameripol) into small pieces for sheeting on a wash mill. This product is processed and handled on standard rubber processing equipment.



forcing agents, plasticizing agents, etc., in order to make the $940,000,000 worth of rubber goods produced in 1940.

Synthetic Elastomers

Although several varieties of materials called "synthetic rubber" are in common use, no one of them is of the same chemical structure as the rubber hydrocarbon. This has never been synthesized.[5, 6] No one of the varieties, types, and grades of the so-called synthetic rubbers is a duplicate of any one of the others or of natural crude rubber in chemical or physical properties.

Schade[7] has well written: "Rubber technologists are not unanimous in agreement as to what properties a synthetic material must possess to qualify as a rubber........Such valuable properties as strength, stretchiness and elasticity are not determined by the kind of chemical elements of which the rubbers are composed but rather by the arrangement of the atoms in the molecules, by the size of the molecules and by the structures produced as a result of vulcanization processes."

Fisher,[9] however, attempted a definition of synthetic rubber thus: "A synthetic rubber may be defined as a substance that can be stretched to at least twice its original length and that after having been stretched, returns to approximately its original length, or position, within a reasonable time."

These quotations are given in order to indicate that research has not progressed yet to the point where the several physical properties of the elastomers are clearly related to known chemical structures. Or, to put it bluntly, the rubber chemist does not *know* the fundamental chemistry of these raw materials.

Another most important consideration is the number of them, which is increasing month by month. Research laboratories are so active that Wood's[8] list of June, 1940 is already out of date. He mentioned 29 different synthetic rubbers, several of which are no longer manufactured, and new ones have been added. The individuals vary enough, as a rule, to require modified methods for factory processing. They are, however, all alike in that the product, as used, is always a polymer of a simpler molecule. But these substances should not be considered as substitutes for natural rubber according to the accepted meaning of that word. Each has its own specific properties; each requires certain added substances which permit the combination to be processed with uniformity in the factories; each requires definite proportions of reinforcing or other agents to yield a compound or mixture of desired properties. Nevertheless, some synthetic elastomers will, when properly mixed and vulcanized, yield compounds which may serve where different ones containing natural rubber already have been found to be of high value. The foregoing statement is cautiously worded. Many vulcanized compounds of natural crude rubber cannot be equalled at the present time by any compound containing any one of the synthetic elastomers. Yet, research in this field proceeds at so rapid a pace that by the time this article is published, it might be possible to find every use for natural crude equalled by some synthetic. The best one can do is to paint the picture as it is today.

It is unnecessary to repeat here the chemistry of natural and synthetic elastomers, which story has been told by others adequately and well. Reference has already been made to Schade[7] and Wood.[8] In addition, the reader will find Fisher's[9] recent article most illuminating. However, a brief review is advisable in order to

Top photo, endless rubber tracks with embedded steel cables for new light tanks and half-track scout cars made by Goodrich. Center left, tire made of Ameripol, Goodrich synthetic rubber. Center right, B-L-B Sub-Strato mask made by American Anode, Inc., of latex compounds and rubber parts that are unaffected by sub-freezing temperatures, for high altitude flying. Bottom, new type waterproof aviation boot developed by Goodrich.

clarify the picture for this discussion. In general, five varieties of synthetic elastomers are of commercial interest.[10] An excellent chart in which the origins and chemical structures are given was prepared by Powers.[11]

1. *Polymers of Chloroprene*

Broadly speaking, this product which occurs in the markets in six different types takes its origin from acetylene, goes through vinyl acetylene to chloroprene, which is then polymerized to yield Neoprene.

2. *Reaction Products of Aliphatic Dihalides with Alkali Polysulfides*

These products start with ethylene which, when chlorinated to ethylene dichloride and treated with sodium tetrasulfide, yields Thiokol. Three types are commercial.

3. *Copolymers of Butadiene with other Polymerizable Compounds*

Basically, these begin with butane obtained from crude petroleum which is changed to butylene and then to butadiene. The butadiene may be polymerized by itself or simultaneously with styrene, with acrylonitrile, or with other substances. The products are the several similar so-called synthetic rubbers known as Buna, Perbunan, Ameripol, Hycar, Chemigum, and so on.

This group of polymers is one which is of great immediate interest in that the fundamental source of the basic raw material is crude petroleum and is the one for the manufacture of which the largest amount of money has been appropriated by the United States Government. Five types of these oil resistant polymers are marketed.

4. *Plasticized Polymers of Vinyl Chloride*

This is the product Koroseal. To obtain it, the starting point is ethylene. This is changed to ethylene dichloride, then to vinyl chloride, which is polymerized to polyvinyl chloride, an amorphous white powder not at all rubbery in its properties. It was found that when a suitable plasticizing agent such as tricresyl phosphate in considerable relative volume was mixed with it, an extensible rubber-like material with very peculiar and useful properties was obtained. Koroseal cannot be vulcanized. It is thermoplastic and its manufacture is similar in general to the other thermoplastic substances. For the chemical structure see Powers,[11] Wood[8] and Fisher.[9]

5. *Polymer of Isobutylene*

To obtain this product, the starting point is isobutane, which is changed to isobutylene and polymerized to polyisobutylene. It has been given the trade name of Vistanex. The monomer is obtained from petroleum. This synthetic elastomer cannot be vulcanized because the

molecule is saturated. The commercial uses of the polymerized product are still somewhat obscure.

One other synthetic elastomer has been called Butyl Rubber.[12] It is derived from petroleum, but little has been published of its actual composition. The originators of it have stated it to be a copolymer of olefins with a small amount of diolefins, and that it contains "only the limited amount of unsaturation required for curing with sulfur."

Schade,[7] explained the *mechanism of vulcanization* when he wrote: "Synthetic rubbers except polymers of vinyl chloride and isobutylene contain doubly bonded atoms. Vulcanization usually involves breakage of one bond at some of these points and either direct chemical union with a similar bond of an adjacent chain (as in the case of Neoprene) or union indirectly through a vulcanizing agent such as sulfur (as with rubber, the Bunas, Ameripols and Butyl rubbers). It is obvious why the polymers of vinyl chloride and isobutylene, which contain no double bonds, will not vulcanize in this manner. Within certain temperature limits, however, these unvulcanized synthetics manifest some of the important properties of vulcanized rubber and may logically be included in the rubber category. In soft rubber compositions cross-bonding during vulcanization occurs at relatively few points. By incorporation of large proportions of sulfur with natural rubber and vulcanizing at high temperatures for relatively long periods all of the double bonds may be reacted and hard rubber (ebonite) produced. The Bunas and Ameripols are like natural rubber in this respect but neither Neoprene nor Thiokol vulcanize to the hard rubber state. Hard rubbers of Perbunan or Ameripol are superior to that made from natural rubber in resisting flow under load at high temperatures."

Physical and Chemical Properties of Elastomers

For emphasis let it be repeated that no one of the varieties of elastomers can be substituted directly for any other one in a given mixture, and arrive at equivalent properties of the vulcanized compound. Certain types and grades of a specific elastomer may naturally replace another grade of the same elastomer to yield corresponding values.

Schade[13] has charted many of the chemical and physical properties and rated the individuals by way of general comparison. His record is repeated here as Chart No. I. These appraisals are suggestive only because different mixtures and degrees of vulcanization achieve different values.

Fisher[9] and Wood[8] arranged tables of the tensile strength and elongation of several elastomers. Chart No. II records a part of Fisher's data.

CHART I*

E = Excellent, G = Good, F = Fair and P = Poor

Property	Rubber	Neoprene	Thiokol	Koroseal	Perbunan	Oil Resistant Ameripol
Abrasion and Tear Resistance	E	G	P	E—if heat is not generated	E	E
Adhesion to Metals	E	E	F	F	E	E
Aging in Storage	E	E	E	E	E	E
Chemical Resistance:						
Oxidizing Solutions	P	P	P	E	P	P
Ozone	P	E	E	E	F	F
Solutions of Salts, Alkalies and Acids	G	G	G	G	G	G
Color Range	E	G	P	E	F	G
Resistance to Cutting	G	G	P	E	G	G
Resistance to Diffusion of Gases	F	G	E	E	G	G
Elasticity and Rebound	E	G	P	F	G	F
Electrical Properties:						
Conductivity	F	F	F	F	F	F
Resistance to Corona Cracking	P	E	E	E	P	P
Dielectric Strength	E	F	F	E	F	F
Flame Resistance	P	G	P	E	P	P
Resistance to Flex-cracking	G	G	F	E	G	G
Resistance to Flow: Cold	E	G	P	F	E	E
Hot	E	F	P	P	E	E
Hardness Range—Durometer A	20-100	10-90	20-80	10-100	10-100	10-100
Low Heat Generation through Hysteresis	E	F	F	—	F	F
Freedom from Odor	G	F	P	E	F	F
Resistance to Swelling:						
Chlorinated or Aromatic Solvents	P	P	G	Shrinks because of extraction plasticizer	P	F
Lacquer Solvents	P	P	G		P	F
Mineral Oil or Gasoline	P	G	E		G to E	E
Water	F	G	—	E	E	E
Resistance to Deterioration by Mineral Oil	P	E	F	G	E	E
Specific Gravity of Basic Material	0.93	1.25	1.35	Ave. Plasticizer Content 1.30	0.98	1.00
Range of Stretchability	E	G	F	F	G	G
Resistance to Checking in Sunlight	F	E	E	E	F	G
Stability of Properties with Change of Temperature:						
Cold	E	F	E	F	G	G
Heat	G	E	P	P	E	E

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CHART II*

Maximum Tensile Strengths and Corresponding Elongations.

	Unvulcanized		Vulcanized Pure-gum Compound		Vulcanized Carbon Black Compound	
	Tensile Strength, psi.	Elongation per cent	Tensile Strength, psi.	Elongation per cent	Tensile Strength, psi.	Elongation per cent
Natural rubber	355	1200	4125	710	5000	650
Buna S	...	....	....	...	4200	650
Perbunan	...	....	2130	900	5000	600
Chemigum	...	....	....	...	4425	630
Hycar OR	...	....	....	...	3500	450
Neoprene	425	1100	4265	820	4125	760
Thiokol A	...	....	....	...	855	370
Vistanex MM	285	1000	nonvulcanizable		nonvulcanizable	
Koroseal, 30% plasticizer	3840	170	nonvulcanizable		nonvulcanizable	

* Published by permission of the American Society for Testing Materials.

A study of these two charts indicates how wide is the variation in the properties shown by the several types of elastomers. Summarized, the similarities and differences between vulcanized natural rubber and vulcanized synthetic elastomers as a group, show the following:

1. Natural rubber compounds are *superior* to all synthetic rubber compounds in: elasticity, change of shape under load and return to the original shape after the load has been removed; low energy loss and low heat generation through hysteresis; softening due to heat (better than two synthetic elastomers only); extensibility; specific gravity; and resistance to stiffening at low temperatures.

2. Vulcanized synthetic elastomer compounds *resemble* natural rubber compounds in the following properties: appearance; they can be manufactured by means of the same machinery; tensile strength and

Photo Courtesy Goodrich

Working on a wing de-icer for a bomber.

modulus; resistance to tear; abrasion resistance; and electrical properties.

3. Vulcanized natural rubber compounds are *inferior* to those of synthetic elastomers in: aging in sunlight; resistance to the action of air and ozone; deterioration by heat; flame resistance; resistance to the action of solvents, oils, fats and greases; resistance to many corrosive chemicals; water absorption; and permeability to gases.

As a deduction from the foregoing discussion, one conclusion is clear: The synthetic elastomer (synthetic rubber if the reader prefers) is here to stay. As expressed by each of its five varieties, it has found a definite place because it has specific values which cannot be realized by natural rubber.

Equally true is the corollary that no one of them can serve in a large number of articles nearly so well as can natural rubber and, therefore, until research has progressed much further, a heavy demand for natural rubber will continue.

Again, so numerous are the varieties and types of synthetic elastomers, so different are their reactions to different oils, temperatures and other service conditions, and so intense are the studies in progress in the laboratories of the manufacturers, that it is folly for any consumer to write specifications descriptive of articles to be made of these materials.

Elastomers in the National Defense

The chief theme of this article is to appraise, so far as our present day knowledge permits, the contribution made by the elastomers, both natural and synthetic, to the needs and services of the national defense.

The description of elastomers and the chemical and physical properties of them does not tell the whole story in these years of war and turbulence. To describe the articles to which natural and synthetic elastomers, each in its own peculiar way, contribute outstanding properties would involve a catalogue of over 30,000 different items. The most one can do is to group the products into a few classes. On account of the military requirements for secrecy, it is inadvisable to particularize on the precise contribution made by any one elastomer. The following groups are well known:

1. The varied uses in transportation. That includes tires and tubes for automobiles, trucks, airplanes, gun carriages, tractors, motorcycles and bicycles. Inner tubes which are self-sealing after puncture by machine gun projectiles are important new articles. In these several uses the natural crude rubber in general serves better than the synthetic elastomers, although in certain respects some types of synthetics can equal or surpass the natural crude. Specifically, treads for heavy duty tires in which Neoprene or a butadiene-copolymer elastomer is the chief ingredient have been found at least equal to one made with natural rubber. On the other hand, the layers of compound between the plies of cords in a large high-speed tire have not yet been proved adequate in service when the compound is composed wholly of synthetic elastomers.

In the transportation field would also be a considerable number of specialties, including many kinds of belts, oil and air hose, insulated flame-proof wire, De-Icers, self-sealing tanks for gasoline, the special tires for the mobile tractors carrying large and small guns, rubber tracks for tanks, sponge rubber, instrument supports, and so on, over a large number. In aircraft alone this number is very large. In a very interesting, but unpublished article, Mr. Charles J. Cleary of the U. S. Army Air Corps states as follows:

"The extent of the use of rubber materials throughout the Army Air Corps can be appreciated by the fact that there are between 2200 and 2500 separate items carried in current stock lists for replacement and maintenance of existing equipment. These items run the alphabetical gamut from 'Absorbers, Rubber' to 'Washers, Rubber' and include Oil and Dust Boots, Casings, Cements, Absorber Cups, Discs, Gaskets, Grommets, De-Icers, Hose Molding, Packings, Pads, Inner Tubes, and Rafts."

Hose for conducting oil, flame-proof insulation, and self-sealing tanks for gasoline, to name but a few, are made possible by certain synthetic elastomers. For these uses natural rubber could not serve. The airplane De-Icer is a good illustration of an article in which both natural and synthetic elastomers play essential parts, and where neither could serve well without the other. Airplane engine and instrument mounts for absorbing vibration are better of natural than synthetic elastomers, particularly those which may become cold when the plane flies at high altitudes.

2. Surgical supplies of various kinds. Oxygen masks, rubber gloves, tubing, adhesive tape. Both natural and synthetic elastomers have advantages in specific articles of this group.

3. Clothing. (The broader than usual use of the term is deliberate.) Gas masks, shoes, heels, soles, war gas-resisting coats and gloves. In general, a choice of a natural grade of crude rubber or a type of synthetic elastomer would depend upon the precise condition of service to which the finished article would be submitted. For instance, war gases (gas masks, gloves and garments) can be resisted much better by several of the varieties of synthetics than by natural rubber.

4. Back of the lines are a multitude of uses. In particular, the chemical-resisting linings for steel tanks, pickling tanks, cars for the transportation of acids and chemicals. The more general line of mechanical rubber goods used in factories for making defense products such as belting, conveyor belts, gaskets, machine supports, etc. These articles are too numerous to warrant a discussion here beyond a statement that where oils, sunlight, oxygen and flame are present, then the compounds should be composed of a chosen synthetic. For a more detailed discussion of rubber in warfare, the reader might refer to a recent article by Finger.[22]

Characteristics of Compounds

It is pertinent and logical to ask ourselves the question: How does rubber serve in so wide a number of articles? In common with other substances, the products which contain one or more elastomers have frequently been described in technical literature, but we have not considered what other substance we might turn to if the supply were cut off. It may be well, therefore, to examine one of the leading articles in the light of the essential properties which it possesses. Just what does it do for us? What would we use if the supply were exhausted? Is there any substitute for the elastomers?

Consider the field of transportation, and only that one product which is most obvious; namely, the pneumatic tire. Boiled down to essentials, pneumatic tires of

whatever size, from the little ones of the motorcycle to the 96-inch ones used on the Douglas B-19 bomber, which tire alone weighs 950 lbs. and has a carrying capacity of 70,000 lbs., the construction elements are identical. These are: (a) inextensible beads to hold the tire on the rim (b) cords of some kind of fabric (c) an adhesion layer to hold the cords together under service conditions of temperature and load (d) a wear-resistant layer for contact with the road and (e) an inner tube to hold the air.

Of these materials (steel wire for the beads, cotton or some synthetic fiber for the cords, and elastomer compounds) the elastomer compounds are peculiar in that they permit the tire to express the following characteristics:

1. Resistance to abrasion. The tread portion which comes in contact with the road has been brought to a high peak of abrasive resistance through the research of the chemists and physicists. This property means long life to the tire and uniformity of service to the machine.

2. Shock absorption. There is a vast difference between the pneumatic automobile tire and that of an old fashioned wheel in reaction to irregularities of the road. Absorption of shocks spells personal comfort to the rider and, what is most important to the national defense, protection to the machines.

3. Blow-out resistance. In normal use, blow-outs may be caused not only through failure of the fabric due to heavy shock or repeated flexing, but also to decomposition of the rubber layers because of heat. Strength is not contributed by the elastomers. Strong in tensile strength though we sometimes believe these products to be, nevertheless, they are not strong enough to sustain heavy loads except under special conditions. Furthermore, they are all extensible. Therefore, whenever load is to be carried as in the case of a tire, one of two courses is open to the designer. Either the volume in the form of solid vulcanized rubber (not hard rubber) must be relatively large as in the case of the solid tires, or else part of the structure must be of some other material which possesses a higher ultimate strength and less extensibility. The most acceptable one, which has been proved by theory, test and practice, is cotton fabric and, in recent years, fabrics made of synthetic fibers such as rayon. Thus, in rubber articles, particularly tires, we deal with an assembly of elastomer compounds and cotton cords.

4. Power efficiency. The elastomer gives to this particular combination of materials the ability to transmit through it the maximum of power from the motor with the minimum of loss.

5. Heat resistance. A tire becomes hot in service due, partly, to the power which is absorbed in it and, partly, to the heat of friction generated by road contact. The elastomer compounds must work together with the minimum of hysteresis loss, for heating means a breakdown of the layers which hold the plies of fabric together, with consequent blowout of the tire.

Inner tubes are used in tires merely to contain air but they, too, must be compounded to develop a minimum of heat and to absorb the work and energy transmitted from the motor and not deteriorate. In fact, all parts of this annular ring must retain their flexibility and strength throughout a normal life of severe service, which experience has proved to be expressed in terms of many thousands of miles.

However, in the case of the airplane tire shock absorption and power efficiency are of greater importance than abrasion and heat resistance. The life of an airplane tire is not expressed in terms of miles of service but in number of landings before failure. Cleary, in the unpublished paper mentioned above, says: "In general, in a group of tires of this type, first failures can be expected as early as 50 landings, and some tires will still be in operation after 1,000 landings, but the mode, or the point of greatest number of failures will be approximately 700 landings."

6. Resistance to punctures. This is a minor matter in peace uses because of the thousands of miles of splendid paved highways over which the larger majority of our vehicles travel. In war, however, where cars and trucks must, of necessity, travel over rough terrain, the inner tubes must be made self-sealing against bullet or any other punctures.

7. Skid retarding because of tread design. This characteristic of an automobile tire is not one to which an elastomer, as such, makes a fundamental contribution. In point of fact, a rubber tread on a wet pavement is so well lubricated by water that skidding is easy. Tread designs have been developed to overcome the natural tendency of rubber to slip. Therefore, for passenger car use, numerous sharp-edged designs are common and large tires upon trucks, gun carriages, etc., have massive projections to permit them to find traction. The value of elastomers here lies in the ease with which the compounds conform to any desired shape during vulcanizing.

Summarizing the above, these properties of tires contribute cost economy, mechanical efficiency, and make possible a mobility and speed never before known in combat. The use of motorized equipment and the speed with which armies are transported is the distinguishing characteristic of the present war in contrast to all previous ones.

Substitutes for the Elastomers

Consider now the question: Can any other substance do the work of the elastomers in tires? Wood or steel might be shaped, to be sure, to replace a solid tire for truck service, but the answer is "no" and the proof is derived from the history of the wheel. The wood wheel came first, then a steel band was necessary because of the rapid wear of wood and, finally, the rubber-treaded tire. These have all been used and the service on even the old slow-moving carriages proved rubber to be many times more wear-resistant than its nearest competitor, steel.

Testing a bullet-resisting inner tube made by Goodrich. Triple layers of special rubber compounds close the bullet holes before air has a chance to escape.

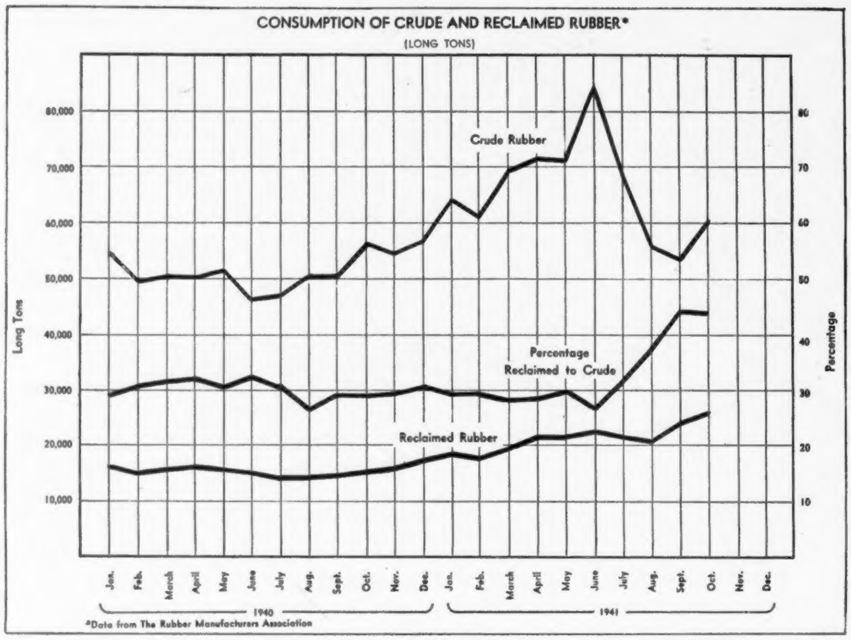


Chart III

Can leather be used? Again let history speak. About 25 years ago a pneumatic tire with a leather tread through which projected hardened steel rivets (studs) was invented in France, made and marketed there, in England, and to a very limited extent, in this country. It was supposed to be non-skid. Service proved the rapidity with which the leather was worn out. And, also, just about that time, tests showed that a black rubber tread would not only outwear the leather, but also the hardest steel studs.

Can Plastics Serve?

Can plastics serve? Although elastomers, broadly speaking, are plastics, by this word is meant the usual inference; i. e., the synthetic resins. This is a field in which many thousands of individual entities are known. So far as the author is aware, no one of them has been tried in a pneumatic tire as a substitute for rubber. They do not possess the peculiar properties of the elastomers. They do not yield and recover quickly after compression or extension, although certain of them possess breaking strengths higher than that of vulcanized elastomers. Rubber yields under shock and returns quickly to its original dimensions. This, however, is merely another definition of rubber. Vogt[14] stated the case clearly: "The resistance of rubber to abrasion is due to its relatively enormous capacity for storing energy. Its energy storage capacity to the point of rupture far exceeds that of any other material."

The conclusion is one which all of us, for a long time, have believed to be true. Nevertheless, it has seemed wise to develop the above analysis and to repeat the deduction for emphasis in this period of stress. No other substance can take the place of the elastomers. They are necessary to the national defense.

The Sources and the Supply of the Elastomers

The elastomers which are so much needed are:

1. *Natural crude rubber*, the sources of which are outside the country.
2. *Reclaimed rubber*, which is made from used vulcanized articles such as tire casings and tubes. The supply all comes from within our boundaries.
3. *Synthetic elastomers.* The raw materials which are chemically treated to produce these products are found in this country in large quantities.

Three problems, then, confront us: The potential volume of natural crude rubber, its availability (can we get it here across the Pacific Ocean?) and the possibilities of production of the synthetics: Neoprene, Thiokol, Butyl, Koroseal, Perbunan, Ameripol, Hycar, Chemigum, and others.

Crude Rubber Production

Natural crude rubber comes from the Far East, Africa, South America, and Central America. About 98% of it is grown on plantations of the British Malay States and the Netherlands East Indies, where some 8,201,018 acres of rubber trees are under cultivation. These produced 1,350,534 long tons in 1940.[18] This output shows the effect of the Rubber Regulations Agreement, for during 1934, the average yield per acre was 483 pounds. Based on the latter figure, there is a potential supply of 1,768,000 long tons.

The wild rubber from South America amounts to about 15,000 tons per year, and the plantations in the upper Amazon Valley are still in the experimental stage. The exports from the Firestone plantations in Liberia amounted to 7,223 tons in 1940. It would scarcely be possible to make any sudden increase in the supplies from the wild rubber in Brazil on account of the shortage of labor or from plantations by new plantings, since the time required between the clearing of the jungle and the first productive crops is estimated at some 7-8 years.

Thus, natural crude rubber can be had, at the present time, up to a possible annual

CHART IV

Production of Synthetic Elastomers in the United States (Long Tons).

	1939	1940	1941	1942*	1943*
Neoprene					
du Pont[19]	1,750	2,500	6,500	13,000	19,000
Thiokol					
Dow Chem. Co. &					
Thiokol Corp.	....	....	(2,000?)	2,000	...
Koroseal					
B. F. Goodrich Co.			No published data		
Vistanex			No published data		
Butyl					
Standard Oil Co., N. J.					
Standard Oil Co., La.	....	....	(2,000?)	2,000	....
Polybutadienes	....	....	5,000	8,000	....
Hycar, Ameripol					
B. F. Goodrich Co.	....	....	....	....	7,000
Buna or Perbunan					
Firestone	....	....	....	....	1,200
Standard Oil Dev. Co.	....	....	....	....	3,500
Chemigum					
Goodyear Tire & Rubber Co.	....	....	....	....	2,500
By U. S. Gov't lease to					
U. S. Rubber Co.	....	....	....	....	10,000
Firestone	....	....	....	....	10,000
Goodyear	....	....	....	....	10,000
Goodrich	....	....	....	....	10,000
	1,750	2,500	11,500	25,000	73,200

* Estimated

volume of about 1,790,000 long tons. Compare this figure with the maximum consumption (estimated) for 1941 of 700,000 long tons (Chart V) and it becomes clear that our needs may be filled if the shipping lanes across the Pacific Ocean are kept open.

Reclaimed Rubber Consumption

Reclaimed rubber plays so large a part in the statistical position of the rubber industry and is so important a raw elastomer, that attention should be paid to it. Chart III records the monthly data for 1940 and 1941 of the consumption of natural crude and of reclaimed rubber. Of particular interest is the sharp decline in consumption of crude in July and August, 1941, which probably indicates the impact of the priorities system in the rubber industry.

The third curve is the percentage of reclaimed to crude, which means the number of pounds, or tons, of reclaimed rubber used to 100 of natural crude rubber. This ratio varied from 26.1 to 44.7%, while in 1927 and 1928, it reached a never exceeded high of 50%.[15]

Some technicians maintain that its use can be increased even in tires and thus a patriotic step, as well as an economical one, be taken toward conservation of natural crude. If the percentage of it to crude can rise to 50% during this present emergency, it would reduce the requirements of natural crude rubber by 20% (calculated against a rough average of 30% for 1940) which, based upon an estimate of 700,000 tons for 1941, would have meant a saving of crude rubber amounting to 140,000 tons.

Synthetic Elastomers Production

The details of present and proposed production of synthetic elastomers are difficult to obtain with any degree of accuracy. Chart IV is offered as a suggestive one only. The sources are the daily press,[20] Bridgwater[19] and privately given estimates of specialists in this field. The figures indicate an increasing activity on the part of the United States Government and of the manufacturing corporations, but, even during 1943 no very heavy displacement of natural crude is contemplated.

This statement may be verified graphically by reference to Chart V, on which has been plotted the annual (corrected) crude rubber consumption for 1938, 39, and 40 and estimated for 1941, 42, and 43. The data for synthetic elastomer production have been taken from Chart IV for these years and plotted to show the relation to crude rubber consumption. The line at 300,000 tons for defense needs is the estimate of Mr. E. G. Holt, Chief of the Rubber Division of the Bureau of Foreign and Domestic Commerce, in a news release. Although this figure will not be reached in 1941,[23] it is a good one to hold in mind. The projected production of synthetic elastomers amounts to only about ¼ of that of the minimum requirements of natural crude or only about 10% of the estimated consumption of 1941.

Cost of Factories and Market Prices

No accurate figures as to cost of factories for the manufacture of synthetic elastomers have been given. Several have been published, but they vary widely and, in general, do not include those for the production of the raw materials such as butadiene, styrene, acrylonitrile, and others. No one has stated this phase of the problem better than Bridgwater[19]: "Adding up the costs, we see that the butadiene, styrene and polymerization plants for making 3300 tons a month of synthetic rubber will cost $33,000,000......In addition to this investment, there will be a further indeterminable investment in facilities for producing raw materials and providing power and other necessary services to the extent not already available. If we should wish to build plants having a total capacity of 30,000 tons a month......it seems probable that......this would result in a total investment of the order of half a billion dollars."

The market prices per pound of synthetic elastomers are various, depending upon the type and grade. The present market for Neoprene is 65c per pound and for Hycar OR 70c per pound. This should be compared with the current market price for natural crude, fixed by the Rubber Reserve Company at 22½c for prime smoked sheets.[16] When one considers, however, that a cost of 6 pence a pound for plantation rubber has been realized[17] one can at least conclude that synthetic elastomers face a severe cost competition.

Tonnage Requirements

It is difficult to calculate accurately the crude rubber requirements for the war in which we are now engaged. It would appear, however, that certain figures may be assumed and at least give us something to think about. Holt (above) estimated requirements for the national defense at 300,000 long tons per year. My own calculations gave figures very close to his. The point of view of the American people has changed since December 7, 1941. The national defense is one idea—an aggressive war may introduce demands of a much higher magnitude. If, for instance, a greater number of long range bombers is contemplated, then the elastomer requirements for airplanes will certainly be more than the tonnage calculated in earlier surveys.

Then, again, no appraisal of "back of the lines" demand is introduced. Workmen travel to shops in their own cars which are numerous. Trucks and buses are required to transport men who work in

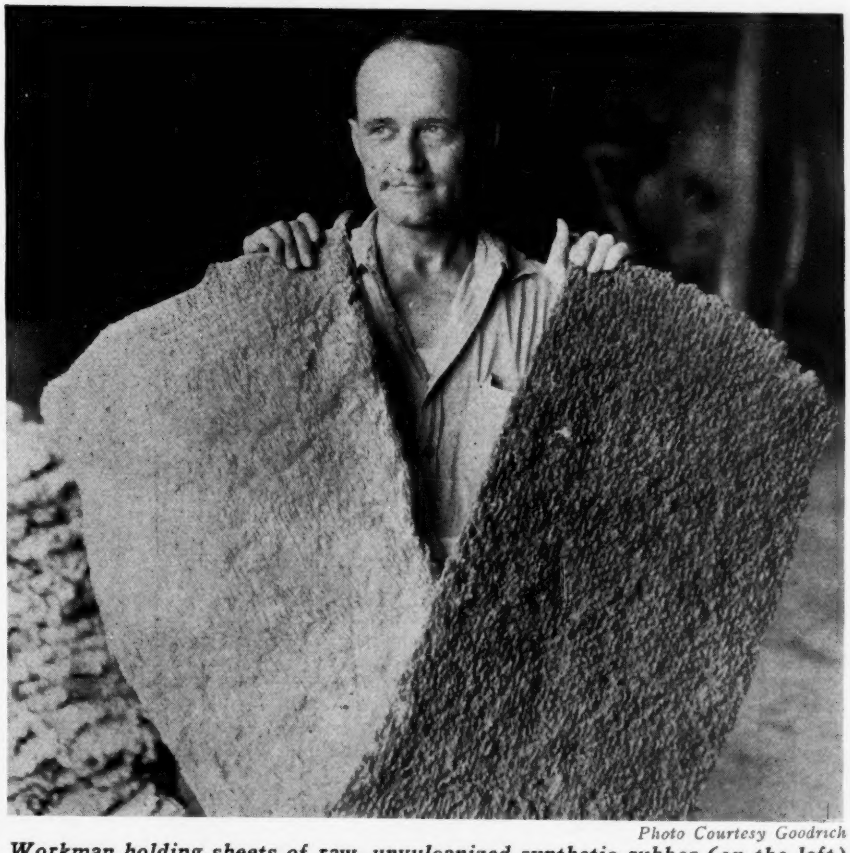
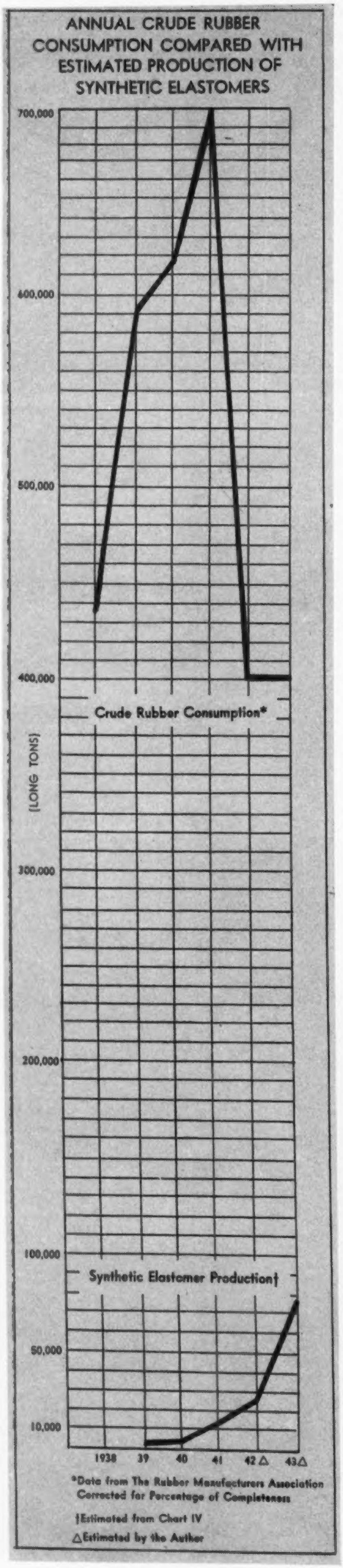


Photo Courtesy Goodrich

Workman holding sheets of raw, unvulcanized synthetic rubber (on the left) and natural rubber (crude washed No. 1, smoked sheet).



defense factories. Passenger cars for pure pleasure can be placed in storage or restricted. What the demand in tons would be for both military machines and for factory workmen cannot be estimated.

However, because of the reduced output of passenger cars and because those now in service can very well reduce mileage and so "live on their fat" for several years, and because of retreading of old tires which saves some, although not much rubber, it becomes probable that the 400,000 tons per year estimate (Chart V) may be a good one.

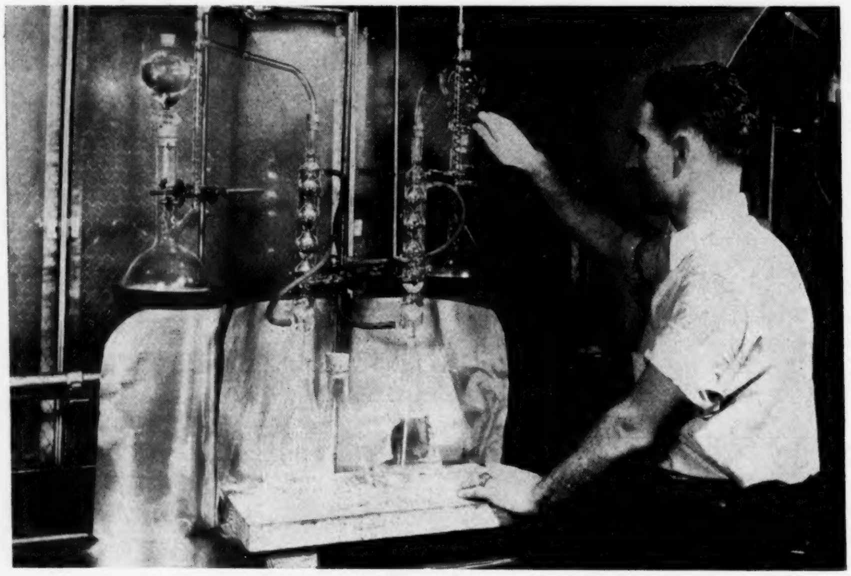
The purely war needs may be calculated to include natural crude 300,000 tons, reclaimed (at 30%) 90,000, synthetics (at the 1941 estimate, Chart IV) 11,500, a total elastomer demand of 401,500. This is probably a fair figure. If reclaimed is raised to 50% of crude consumption, the requirements for natural crude would be lower. An ample potential volume of reclaimed has been reported by Coe[24] who stated the capacity of the Rubber Reclaimers Association to be 300,000 tons annually. Nevertheless, if the country continues to use crude rubber at approximately the 1940 rate, the stocks in sight are only about a year's supply, which is too close a margin.

Figures are always intriguing, especially when they include sanguine estimates. The vulnerability of the foregoing ones is understood by the author. He is particularly well aware, because of his experience, of the burden which an attempt to increase the consumption of reclaimed rubber would place upon the minds of rubber technologists. Nevertheless, the suggestion is made not only because of his abiding confidence in their notable ability, but also because he believes that essential properties of defense products would not be lost. A few thousand miles of tire tread wear might be sacrificed but, for army machines, service is not to be measured in terms of those long mileages to which the consumer of passenger car tires is accustomed. However, a larger volume of reclaimed rubber need be considered only as a "war emergency" in case the Pacific Ocean transportation should be stopped entirely.

Our Government wisely anticipated trouble when it set up the Rubber Reserve Company which has purchased 157,972 tons of crude rubber of which 140,318 tons have been delivered to the Reserve stockpile. 430,000 tons were authorized.[21]

This large "stockpile" of natural crude rubber brings to mind a weakness of the material, which is its tendency to oxidize and so to deteriorate under certain conditions. If the period of storage is to be long —2 to 5 years—the best possible safeguard of quality is to sink it in water, or to surround it with an atmosphere of carbon dioxide or nitrogen. In either case, the problem is a complicated one. In any event, it should be stored in a northern climate where it must be protected from heat and sunlight.

Significant conclusions can be deduced from a comparison of the 300,000 tons of natural crude required for the war machines with the monthly imports and the stocks of natural crude rubber on hand and afloat. These have been plotted on Chart VI, and show how the stocks have increased during this year. Let us look at the actual figures from a release by the Rubber Manufacturers Association. At the end of October, the stocks on hand were



Dr. G. L. Browning, Goodrich research chemist, purifying by distillation one of the minor ingredients used in the process of producing synthetic rubber from petroleum, gas and air. Left, chart V.

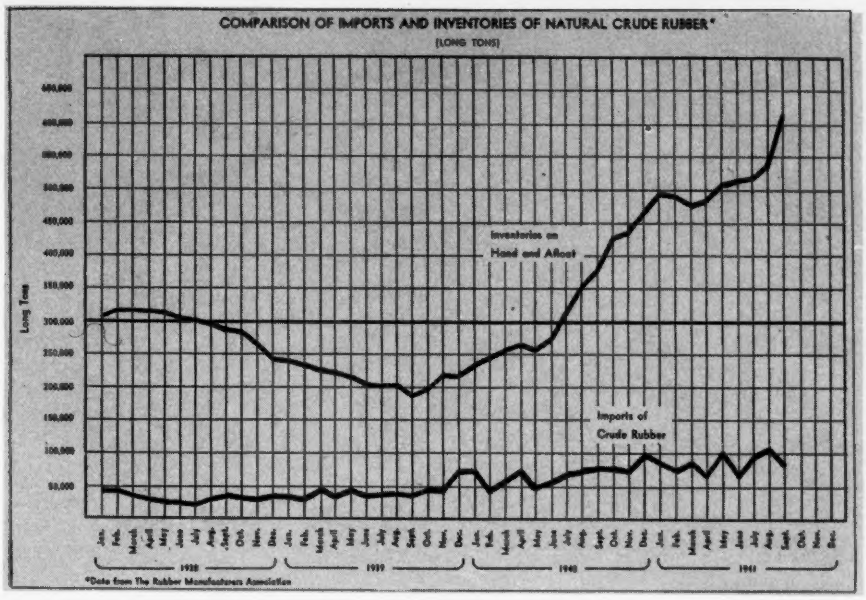


Chart VI

454,711 tons and afloat 172,633 tons, a total of 627,344 tons. These data are not greatly different from those as of the end of September. Because consumption has been declining, it is fair to assume the situation to have been at least as favorable on December 7. If all the crude rubber afloat (172,000 tons) can be received at our docks, then we would have about two years' supply for military consumption of 300,000 tons per year.

This reasoning brings forcibly in front of us the question of enlargement of the factories for the production of synthetic elastomers. The time required to change the 1943 estimate of 73,200 tons to a realization of, let us say, 200,000 tons or more, varies with the engineer who makes the prediction. A year and a half is probably a conservative average.

Summing it up, such figures do show that this country is in a fair position at this moment with respect to its supply of natural crude rubber and our factories should not be shut down during this interval within which additional capacity for production of synthetic elastomers can be built.

Production volume of reclaimed rubber can be increased but the source—old scrap tires—although today available in some volume if collected, will dwindle in proportion to the lowered mileage of passenger cars and because of retreading of used tires.

Suggestions have been made that the United States grow its own supply. Edison's goldenrod experiments in Florida are recalled. The Russian experiences have been mentioned in the press. However, the most pertinent is planting a large acreage of the Mexican shrub from which Guayule rubber has been obtained for more than thirty years. Of this, we normally use about 4,000 tons per year. The technologists are familiar with it in both its raw and resin-free states.

The source is a shrub which grows wild in northern Mexico and has been studied and cultivated in California. The plant requires four or more years to mature, when it is pulled up, roots and all, and the rubber obtained by processing. At the end of six years, a yield of 2,160 lbs. per acre[25] may be realized; i. e., 360 lbs. per acre per year. Spence, one of this country's foremost authorities on Guayule, believes it may be made an annual crop.[26]

The quality of Guayule rubber is not equal to that of the plantation grown Hevea variety. In its raw form it contains 20% of soft resin. Deresinated, its quality value is about 80-90% of that of smoked sheets.

However, a dependable supply of synthetic elastomers can be obtained much sooner than can Guayule or any other kind of farm produced elastomer. Additional acreages as a more remote source may be wise.

One other thought is worth our attention during these early days of 1942; on the sea, on land, and in the air, this is a war in which efficiency, mobility, and speed of equipment are characteristic and essential. To these fundamentals, elastomer compounds make outstanding contributions.

Summary

The purpose of this article has been to examine natural and synthetic elastomers briefly in accordance with their physical and chemical properties; to outline a number of the uses to which they are put and, so, the part which they play in the national defense; to examine (in the field of transportation) the reason why they are able to serve better than any other material; to determine the potential and available volume of natural crude rubber, reclaimed rubber and synthetic elastomers; to estimate the consumption of these materials; and, finally, to reason to a conclusion regarding the position of this country with respect to its supplies of these products.

In addition it has been indicated that the most outstanding contribution which the elastomers make to war and our national defense is that they permit an efficiency of equipment and speed of movement which could not be realized were any other substance used. Rail transportation is naturally the means by which troops and equipment may be transported over long distances. Nevertheless, the miles from railroads to battle lines are many, and the areas of conflict greater than ever before attempted. Thus, it is upon rubber shod vehicles that the strategists depend for velocity and mobility at the actual front.

Acknowledgments

In the preparation of this article it has been my pleasure to receive special analyses and valuable assistance from several members of the staff of the B. F. Goodrich Company, Akron, Ohio, to whom grateful acknowledgment is made.

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Personalities in Chemistry

ALEXANDER ALEXIS NIKITIN

ALEXANDER Alexis Nikitin is occupied with the oldest, and at the same time probably the least developed branch of chemistry; that is, the application of chemistry to agriculture. For the last ten years he has devoted his entire efforts to the study and development of fertilizers and copper fungicides, parasiticides and insecticides. Since March 1937 he has been associated with the research staff of the Tennessee Corporation, at Copperhill, Tennessee.

Nikitin's passion for agricultural chemistry developed quite naturally from his background in Russia. His father was a sugar beet farmer; while his mother was a physician. On entering the Moscow Gymnasium, his mother influenced Nikitin to major in chemistry, "because," she pointed out, "it is a fundamental science and basic training for almost every vocation." At the same time his father's pursuit instilled in Nikitin an impelling interest in agriculture.

Upon receiving the chemical engineering degree in 1915 from the Moscow Imperial Technical Institute, Nikitin was sent by the Russian government to the United States to purchase ammunition needed in World War I. More than $500,000,000.00 passed through his hands on this mission. The Russian Revolution of 1917 at once terminated Nikitin's mission in this country and left him virtually an exile. Being already in close contact with the Du Pont Company, Nikitin offered his services to that organization. He was accepted eagerly, and up to 1918 worked at Wilmington on the development of explosives.

By

A. D. McFadyen

With the war over, Nikitin began to reflect upon a more peaceful outlet for his talents. Since his arrival in America he had been astonished to find in this country of amazing industrial development, that agricultural practices were little different from those followed in his native Ukraine. He was captivated by what Henry Ford had done for transportation and he was thrilled by sight of the first Ford farm tractor. But in Nikitin's estimate concerted technical assistance to the farmer ended with the tractor. At that time, insects alone were costing the American farmer several billion dollars yearly; blight cost him still further billions. "Why," Nitikin asked himself, "is farm practice in America relatively so far behind industrial technique"? The age and magnitude of the problem served as a challenge to and an opportunity for Nikitin.

Accordingly, in 1918 he began preparation by entering the Massachusetts Institute of Technology giving special attention to chemical courses pertinent to agriculture. He was graduated with the degree of Bachelor of Science in 1920, but he continued his work at the Institute research laboratory for another year under the direction of Professors C. R. Hayward and E. C. Locke.

In 1922, at the behest of the well-known Professor Ivan I. Ostromislensky, Nikitin joined the research staff of the United States Rubber Company, serving first at the general laboratories in New York City, and later at Passaic, New Jersey. During ten years with this organization, Nikitin was engaged in the study of colloid chemistry of latex and various plastic substances. Meanwhile he was taking courses in advanced chemistry at Columbia University, in turn being awarded the doctorate degree.

Ten years thus elapsed before the opportunity for which Nikitin had been preparing presented itself. In 1932 Nikitin was appointed Research Fellow in Chemistry at the Agricultural Experiment Station of the University of Delaware, this fellowship being created under the aegis of the National Research Council (Crop Protection Institute). In cooperation with the departments of chemistry and plant pathology of the University, Nikitin devoted his attention to the study of zeolites, with the result that he developed a basically new fungicide, now commercially known under the trade name "Z-O."

Since joining the Research Department of the Tennessee Corporation, Nikitin has been active in the development and study of copper fungicides as well as studies on the use of minor elements and fertilizers in agriculture. His activity covers both the laboratory development and the field tests.

The laboratory investigations are concerned with the determination and study of the physical and chemical properties of copper fungicides in relation to their stability and performance. It is here that the toxicity of the compounds as well as their properties of coverage and adherence are carefully observed. The field research is conducted in cooperation with state and federal experiment stations in the United States, Canada, Jamaica and South America. This permits the study of the performance of the compounds under the climatic conditions prevailing where they are to be used. The fungicide research program of the Tennessee Corporation is outlined to coordinate as closely as possible the experimental and practical work.

In recent years the nation has been aroused concerning farm losses due to insects and blight, with the result that every state of the union has set up bureaus to study plant diseases and insect scourges, while the United States Department of Agriculture has gone "all out" to combat such losses. As a result crop losses have now been reduced to approximately three billion dollars annually; two billion being due to insects, and one billion to disease. In working on this problem, the Tennessee Corporation staff is not in competition with the various governmental bureaus, but rather they work in cooperation with them, fully exchanging

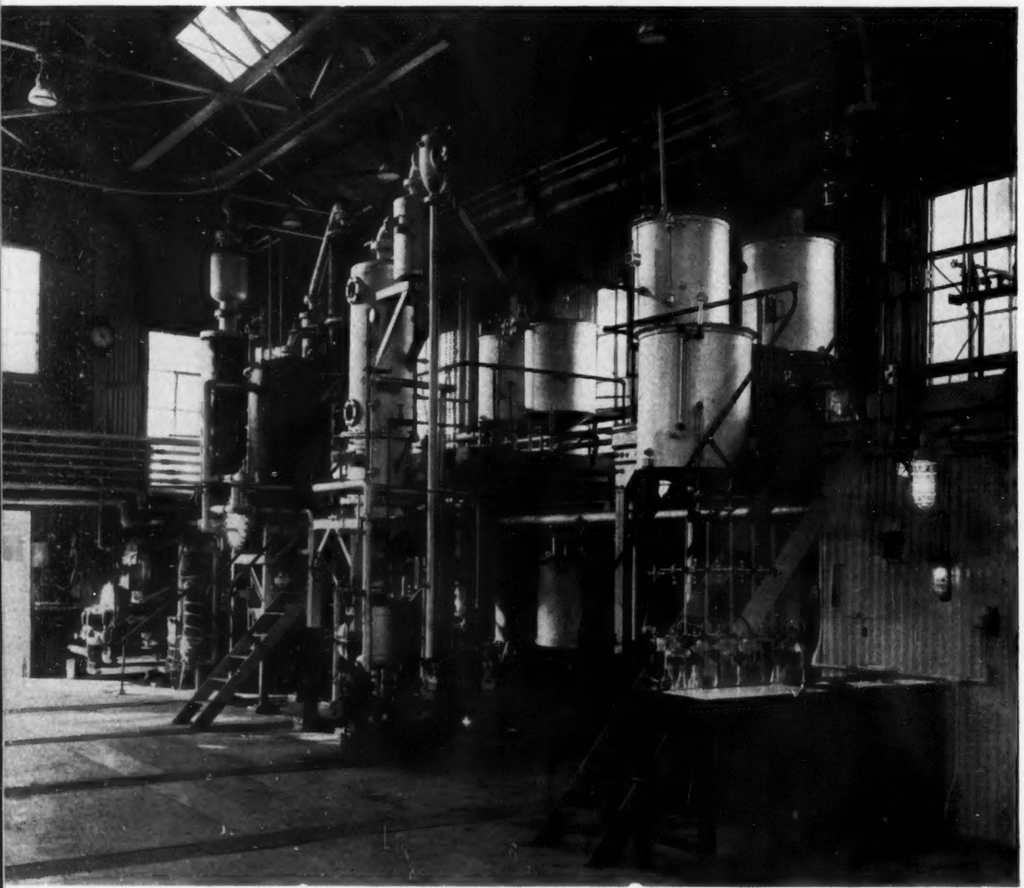
(*Continued on Page 90*)

Glycerin, Its Compounds and Uses

By Benjamin Levitt, F. A. I. C., *Consulting Chemist*

Concise, yet complete and comprehensive is this article on glycerin, its compounds and uses. Included is a review of the synthetic method for production of glycerin from cracked gasoline, as recently developed by research chemists of the Shell Development Company at the research laboratory at Emeryville, Calif.

General view pilot glycerin plant. *(Shell Development Company Photo)*



THE discovery of glycerin by Scheele, in 1779, was accidental, as were so many other chemical discoveries. While making lead plaster, with olive oil and lead oxide, this young Swedish scientist obtained a byproduct, which he called "principium dulce olearum," the sweet principle of oils. Little did Scheele realize that in 1940, the United States consumption would amount to 152 million pounds.

Glycerin occurs in all animal and vegetable fats and oils, where it is combined with the fatty acids, in the form of glycerides. Most fats and oils yield about 10.5 per cent. glycerin, but cocoanut and palm kernel oils yield almost 14 per cent.

The most important process for the production of this chemical, is via the soap kettle. That is, when a fat or oil is saponified with an alkali, soap and glycerin are formed, as indicated by the following reaction:

$$\begin{array}{l} C_{17}H_{35}COOCH_2 \\ C_{17}H_{35}COOCH \\ C_{17}H_{35}COOCH_2 \end{array} + 3\ NaOH = \begin{array}{l} C_{17}H_{35}COONa \\ C_{17}H_{35}COONa \\ C_{17}H_{35}COONa \end{array} + \begin{array}{l} CH_2OH \\ CH\ OH \\ CH_2OH \end{array}$$

There are two other processes by which glycerin may be obtained from fats: 1. By means of water at atmospheric pressure, and 2. at high pressure, in a digester, with or without a catalyst. These processes known as "fat splitting" or hydrolysis, yield glycerin and fatty acids. Both high and low grades of fats may be so split.

Glycerin is also a byproduct of the fermentation of molasses and other carbohydrates, but the yield is small and the glycerin is not usually recovered. However, it is said that Germany produced 13,000 tons a year, during the first world war, by a fermentation process. The process is somewhat as follows, according to a recent British patent No. 488,464: 50 Kg. $NaHSO_3$ is slowly added to a fermenting batch of 100 Kg. sugar, ammonium phosphate 2, magnesium sulfate 2, and top fermentation yeast race M. 10 Kg., in 1000 L. water. 25,000 L. air per hour is supplied through a porous ceramic body. The pH is kept within limits by adding alkali when necessary. After 8 hours, the glycerin is recovered in the ordinary manner. Other patents recommend the addition of kieselghur to form a paste, which is then dehydrated, and the glycerin is extracted with acetone or other solvent. The glycerin may then be distilled.

Synthetic Glycerin

Recent researches by Drs. Williams, Groll, Hearne and others of the staff of the Shell Development Co. covered by U. S. patents 2,072,016, 2,154,930, and 2,207,193, have disclosed that unlimited quantities of glycerin may be produced synthetically from cracked gasoline. This has been hailed as one of the most important chemical achievements during World War II.

Briefly stated, this process consists of six steps:

1. Chlorination of propylene at 500°C. to produce allyl chloride. (Propylene is one of the gaseous products of the cracking process). 2. Hydrolysis of allyl chloride with caustic soda. 3. Chlorhydrination of allyl alcohol with a solution of hypochlorous acid, produced by reaction of chlorine with caustic soda. 4. Recovery of glycerin monochlorhydrin with 10 per cent. NaOH and one per cent. Na_2CO_3 to glycerin. 6. Glycerin is extracted with xylol and distilled in vacuuo.

A pilot plant has been set up, which is capable of producing 2,000 pounds a day, with a 90 per cent. yield. The glycerin so produced has been tested physiologically and found equal to C. P. grade.

Although this process has not yet attained commercial importance, it can be made ready to fill the gap, should ordinary production be unable to supply increasing demand for this chemical. Moreover, if this process becomes a commercial

reality, it should have the effect of stabilizing prices to a considerable extent. What effect the recent O. P. A. price ceiling on glycerin will have on synthetic production, remains to be seen.

U. S. Patent 2,211,626 to E. I. du Pont de Nemours & Company covers a process for glycerin production by condensation of carbon monoxide with formaldehyde to yield glycolic acid. This is treated with a formal and alcoholysis of a formaldehyde derivative of glycerin.

Production and Purification

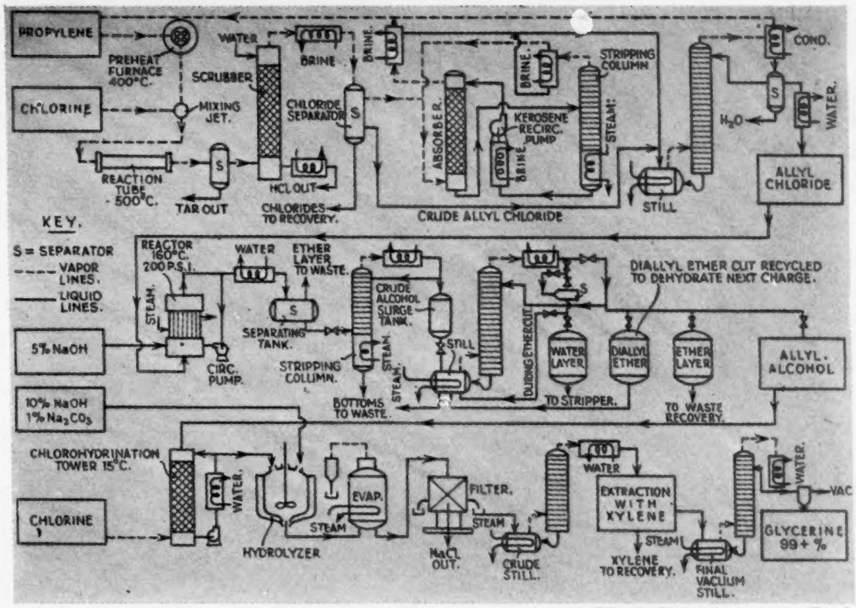
Glycerin as produced in the soap factory, is a component of the spent lye, which has been drawn off. The glycerin content of such liquor, depends partly on the number of washes to which the soap has been subjected and upon the quality of the fats which have been saponified. High grade fats will yield spent lye containing nine to ten per cent. glycerin in the first two spent lyes. However, as each succeeding wash yields less and less glycerin, the combined waters reaching the evaporator, may be as low as three to four per cent. glycerin. When the market is favorable, as much glycerin as possible is extracted from the soap. However, when the glycerin market is otherwise, part of the glycerin is allowed to remain in the soap.

Spent lye as it is drawn from the soap kettle, contains such impurities as soap, salt, traces of caustic soda, carbonate of soda, sodium silicate (from re-boiled scrap), organic matter such as albumin and dirt.

The settled, cooled and skimmed lye is pumped to the first treatment tank, where it may be treated with two and one half pounds of ferric chloride per 1000 pounds lye and well agitated by means of an open steam coil or with compressed air. Hydrochloric acid is then added to slightly acidify the solution. Another method is to add a half pound of aluminum sulfate per 1000 pounds lye, together with the ferric chloride. By an alternative method, the lye is treated with a strong solution of calcium chloride. This precipitates the impurities and leaves the lye slightly alkaline.

Where acid or acidic salts are used in the preliminary treatment, the liquor is usually made slightly alkaline and then filtered. If a test proves that there are still some organic impurities which may be precipitated out, a secondary treatment as before is given, and the liquor is filtered once more.

It should be noted that while some manufacturers use sulfuric acid to neutralize the liquor, by and large, the practice is not a good one. The introduction of Glauber Salt as the result of the reaction between the alkalies and the sulfuric acid, tend to crystallize on the tubes of the evaporator to a greater extent than does sodium chloride, resulting in impeded heat



(Shell Development Co.)

Flow sheet of glycerin synthesis from propylene. This and the chart below reproduced from the Transactions of the American Institute of Chemical Engineers, Vol. 37, No. 1, February 25, 1941, page 157.

transfer. Then too, the fact that the salt recovered from the evaporator is used over in the soap kettle, makes the use of sulfuric acid objectionable.

The purified liquor is now transferred to a vacuum evaporator, which operates in double effect where large scale production obtains, or a single effect evaporator may be used. There is considerable economy in steam and also in water requirements where double effect evaporation is employed.

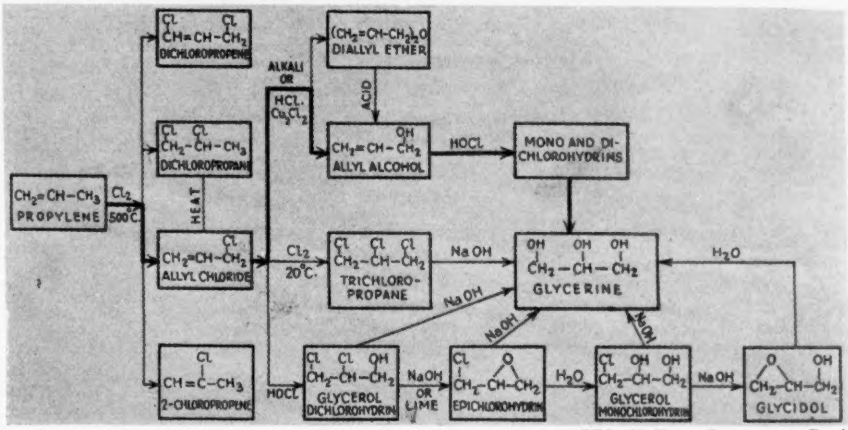
As the liquor becomes concentrated, the salt precipitates out. When a concentration of 40 per cent. glycerin is reached, the charge is dropped into a salt separator. The salt washed and steamed is returned to the kettle room. The half crude is then further evaporated to 80 per cent. glycerin content. This is either distilled at the soap plant or sold to glycerin distillers under the name of 80 per cent. soap lye crude.

Crude glycerin produced by fat splitting process is usually purer than that produced from soap lyes. Most of the impurities remain with the fatty acids and hence, the "sweet waters" resulting from the hydrolysis, contain sulfuric acid as the principal impurity. Treatment merely consists in neutralizing the acidic glycerin water with lime. After filtering, it is evaporated as above, to a concentration of 88 per cent. and is known in commerce as 88 per cent. saponification crude. It requires only distillation.

Grades of Glycerin

There are four grades of refined glycerin. The chemically pure, which has been bleached a water white with decolorizing carbon, is made to meet the requirements of the U. S. P. It is suitable for use in medicinals, foods and cosmetics. Its specific gravity is 1.249 at 25°C./25°C. and contains 95% actual glycerol.

The High Gravity grade, is a pale yellow color, used for industrial purposes



(Shell Development Co.)

Reaction chart illustrating the possible synthesis of glycerin, using propylene as the starting material.

and has a specific gravity 1.262 at 15.5/15.5°C.

Dynamite grade has a specific gravity of 1.262 at 15.5/15.5°C. is made especially for explosives.

Yellow Distilled is used for industrial purposes, and has a Sp. Gr. 1.259 at 15.5/15.5°C.

Properties and Uses

Because of its desirable properties, glycerin has manifold uses. It combines well with other chemicals and for this reason, it may be made the starting point for various syntheses. It has the property of humectancy (water absorbing and moisture retaining). It is not volatile. It is a good solvent and has food value. It is colorless, odorless, sweet tasting, viscous, high boiling (290° C.) and practically non volatile. It is a trihydric alcohol and readily forms esters. Nitroglycerin, discovered by Alfred Nobel, is an ester of importance. When the latter is absorbed in kieselguhr, it is known as dynamite, which is used to some extent as a war material, but chiefly in all sorts of blasting for construction and in mining. Admixed with nitrocellulose it is known as blasting gelatine.

Of more recent commercial importance are the esters which result from the reaction of glycerin with polybasic organic acids. The alkyd resins are products of the reaction between glycerin and phthalic anhydride. These are used to a great extent in baking enamels and quick drying varnishes, printing inks and for moisture proofing paper.

Glycerin combined with rosin is known as ester gum. Triacetin, formed from acetic acid and glycerin, produces a lacquer solvent. Glycerophosphates and glyceroborates are used in pharmacy. Leadglyceroxide is used very widely as a cement for pipe joints.

Glycerin is used in foods, beverages, transparent wrappings, tobacco, textiles, printing inks, bookbinding, photographic supplies, cosmetics, rubber, leather, printers' rollers, sausage casings, plant growth stimulants, disinfectants, copying materials, gas meters, shock absorbers, shoe polish, precision instruments, soldering fluxes, dentifrices, soaps, etc. It has been estimated that the tobacco industry consumes 20 million pounds of glycerin per annum.

As a solvent, glycerin acts somewhat like water and alcohol. Phenol, thymol, boric acid are more soluble in glycerin than in water. It is soluble in water and in alcohol in all proportions. This property is made use of, in anti-freeze solutions, which is illustrated on Table 1.

While on the subject of anti-freeze, it may be appropriate to cite here, that aside from this use of glycerin by the automotive industry, it consumes 19 million

Percentage (by volume) in water and Freezing Points (Table 1)

	10%		20%		30%		40%		50%	
Glycerin	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.
Sp. Gr. 1.2539	—2	29	—6	21	—11	12	—18	0	—26	—15
Methanol & Glyc. 1:1 by vol.	—4	25	—9	16	—15	5	—24	—11	—35	—31

Consumption of Glycerin by the Automotive Industry (Table 2)

Alkyd resins and other resins in protective coatings	13,100,000 Lbs.
Rubber compounding and treating	1,080,000
Polishes	125,000
Steel Quenching and tempering media	225,000
Brake and shock absorber fluids	550,000
Tire, auto top and other special paints	230,000
Glass cleaners and anti-mists	145,000
Battery plates, electrolytic condensers, electroplating sols.	250,000
Safety glass laminations	550,000
Manufacture and treatment of artificial leathers	250,000
Special lubricants	550,000
Miscellaneous items, including: upholstery cleaners, wiping cloths, metal cleaners and polishes, motorists' soaps, industrial skin protectives, radiator anti-leak compounds, puncture sealing comps., solder fluids, masking preparations, small molded parts	1,945,000
Total Estimated Consumption	19,000,000 Lbs.

United States Production of Glycerin (Table 3)

Year	Crude, 80% Basis	Dynamite Grade	Chemically Pure
1931	140,001,604	43,366,048	70,527,961
1932	133,918,825	41,538,670	63,623,975
1933	119,811,648	45,634,280	58,585,438
1934	153,115,463	48,553,475	80,358,660
1935	141,184,825	48,685,282	74,704,505
1936	154,095,960	47,535,209	85,386,328
1937	169,038,709	51,793,568	92,889,111
1938	162,120,070	43,613,526	91,326,551
1939	184,476,395	65,528,366	86,950,963
1940	197,096,198	72,282,098	89,562,957
1940 1st 6 mos.	101,666,000	36,890,000	42,477,000
1941 1st 6 mos.*	122,444,000	46,063,000	51,593,000

* Preliminary.

Factory Operation for the Half Year Ending June 30th
[All figures given in thousands of pounds]

	Production		Consumption		Stocks	
	1940	1941	1940	1941	1940	1941
Glycerin:						
Crude, 80% basis	101,666	122,444	100,564	127,087	16,519	23,267
Dynamite	36,890	46,063	18,852	27,688	27,736	27,292
Chemically pure	42,477	51,593	14,975	20,050	34,444	24,144

U. S. Dept. of Commerce.

IMPORTS

United States Imports of Crude and Refined Glycerin

Year	Pounds	Value
Crude:		
1931	10,132,963	$525,599
1932	5,382,252	204,626
1933	8,473,085	246,895
1934	15,081,227	1,040,065
1935	8,220,934	656,734
1936	11,148,985	1,199,360
1937	13,441,430	2,243,382
1938	13,097,525	1,028,192
1939	10,987,731	729,264
1940[1]	9,096,283	615,212
1940 (1st 7 mos.)[1]	4,114,693	305,079
1941 (1st 7 mos.)[1]	5,549,580	406,726
Refined:		
1931	1,965,535	140,975
1932	2,347,508	142,359
1933	2,775,687	166,991
1934	2,213,942	208,989
1935	68,366	8,277
1936	3,447,487	594,036
1937	7,535,120	1,827,189
1938	2,567,411	218,560
1939	330,078	29,215
1940[1]	298,198	23,198
1940 (1st 7 mos.)[1]	1,048	170
1941 (1st 7 mos.)[1]	110,930	9,276

[1] Preliminary.

pounds a year for other purposes, according to the Glycerin Producers of America. Other uses are listed on Table two.

It is reasonable to assume that the tobacco and automotive industries together, consume about 20 per cent. of our entire production of glycerin.

Production figures of the past ten years, run parallel to our industrial activity over the same period, as shown on Table 3. (See opposite page.) Also see page 90 for glycerin O. P. A. price schedule.

Glycerin Derivatives

Name	M. Wt.	Boiling Range ASTM Gas. Still °C.	Sp. Gr. 25° C. 25° C.	Soluble in	Insoluble in	Solvent Props Soluble	Solvent Props Insoluble	Uses
Glycerin a. monochlor hydrin	110.52	136–142° @ 40 mm.	1.318	water alcohol glycerin	CCl_4 benzol gasoline	Nit. cell. in Bu. Ac. soln. Cell. Ac.	Ester gum rosin Damar Carn. wax linseed oil	synth. of ethers, NH_3 Rodenticides
Glyc. a. y. dichlor- hydrin	128.97	90% 172–178° @ 736 mm.	1.3591	alcohol Glyc. CCl_4 C_6H_6	Sl. in H_2O gasoline	Est. gum rosin linseed Cell. Ac. Cell. Nit. in Bu. Ac.	Damar Carn. wax	synth. solvent
Epichlor- hydrin	92.5	90% 114–118° @ 736 mm.	1.1839	Alc. CCl_4 C_6H_6 gasoline linseed oil	Glyc. H_2O	Est. gum rosin Cell. Ac. Compat. w. Cell. Nit. in Bu. Ac.		synth. lacquer formula mold growth inhibs.
Glyc. a. mono- methyl ether	106.08	90% 215–220° @ 745 mm.	1.1147	H_2O Alc. Glyc. C_6H_6	CCl_4 gasoline	rosin Compat. w. Nitrocel. in Bu. Ac.		alkyd. resins syntheses select. solvent
Glyc. a. mono. n. but. Ether	148.2	90% 133–137° @ 18 mm.	0.945	Alc. CCl_4 C_6H_6 gasoline linseed	Sl. in H_2O Glyc.	Est. Gum rosin		solvent prep. of alkyd resins ether-resins
Glyc. a. mono-iso- amylether	162.14	90% 252–260° @ 745 mm.	0.987	H_2O* Alc. Glyc.* CCl_4 C_6H_6 gasoline linseed		rosin Compat. w. Nitro. Cel. in Bu. Ac.		alkyd. resins syntheis ether-esters. solvent
Glyc. a. mono.- phenyl ether	168.1 Cryst. solid (white)	150–155° @ 4 mm. M. p. 53–54		H_2O C_6H_6 Alc. Glyc. CCl_4 (60°)	Gas. CCl_4	Compat. w. Est. gum rosin Nit. Cel. in Bu. Ac.		alkyd. resins plasticizers
Glyc. a. y. Dimeth. ether	120.15	90% 164–170° @ 736 mm.	1.003	H_2O C_6H_6 Alc. Glyc. CCl_4 Gas.	linseed oil	rosin Cell. Ac. Compat. w. Cell. Nit. In Bu. Ac.		solvent plasticizer
Glyca. a. y. diisoamyl ether	232.35	90% 147–153° @ 10 mm.	0.903	alcohol CCl_4 C_6H_6 Gas. linseed oil	H_2O Glyc.	Ester gum rosin		solvent plasticizer
Glyc. a . y. diphenyl ether	244.28 white cryst. solid	M. p. 80–81°		Alc. C_6H_6 linseed oil	H_2O Glyc. CCl_4 gasoline	rosin Ester gum Carn. wax Cell. Ac. Compat. w. Cell. Nit. in Bu. Ac.		plasticizer
Glyc. Formal	104.06	90% 192–195° @ 738 mm.	1.2198	H_2O Glyc. Alc. CCl_4 C_6H_6	gasoline	Ester gum rosin Cell. Ac. Compat. w. Cell. Nit. in Bu. Ac.		H. B. sol. bacteria mold and for lacq. preserv. vs.
Glyc. Furfural	170.16	90% 163–167° C. 22 mm.	1.267	Alc.	Gas. CCl_4 Limit. Sol. in H_2O Glyc. C_6H_6			H. B. sol. in Lacq. preserv. vs. mold bacteria

* Certain proportions

Chemical Chronology, 1941

January

United States becomes "National Defense" conscious—Defense Supplies Corp. contracts for 300,000 tons of nitrate—Cyanamid's Calco Division celebrates 25th birthday—Indictments handed up by federal grand jury charges conspiracy among the Aluminum Co. of America, Dow, the German dye trust, three other concerns and nine individuals to curb magnesium supply—Plans announced by Permanente to produce magnesium by Hansgirg Process at $12,000,000 plant at Cupertino, Calif.—Government export license system extended to include potash and a number of non-ferrous metals—Phosphate Mining announces plant expansion at Nichols, Fla.—Chemical Priorities Board formed with Dr. Harrison E. Howe, Editor, I. & E. C., as chief executive—Diamond Alkali forms subsidiary, Diamond Alkali of Texas and plans new silicates factory—Barada & Page takes over Russell-Hale Co.—A. C. Boylston succeeds late Oscar L. Biebinger as Mallinckrodt president—General Chemical to erect West Coast plant at Vancouver—Pfizer to construct $750,000 research and office building—Liquid Carbonic acquires Independent Oxygen and Wall Chemicals—Delta Chemical, Baltimore, begins production of paradichlorbenzene—George A. Anderson elected president and chairman of the board of Pfizer—United States Defense Program includes approximately 25 units for the manufacture of ammonia, ammonium nitrate, smokeless powder, TNT, DNT, tetryl, toluol, etc.—F. G. Tallman, Jr., Du Pont, elected president, Compressed Gas Manufacturers' Association at annual meeting—Monsanto starts operating additional furnace for production of elemental phosphorus at Monsanto, Tenn.—Walter Merrill, Joseph Turner & Co., elected president Salesmen's Association—J. V. N. Dorr, president, the Dorr Co., receives Perkin Medal—August A. Wasserscheid, Mallinckrodt, tendered surprise dinner on 70th birthday—Approximately $10,000,000 in contracts awarded for gas mask charcoal plants—Contract signed with E. B. Badger & Sons Co. to build $10,000,000 TNT and DNT plant at Sandusky, Ohio, to be operated by Trojan Powder—Deaths: Stanley Weil, Natural Products Refining vice-president; William P. Pickhardt, senior vice-president, General Aniline & Film; Carleton Ellis, one of the country's outstanding chemists.

February

Nine-man Production Planning Board formed—Priorities invoked for first time on an industry-wide mandatory basis, the products being aluminum and machine tools—"Priority techniques" invoked for magnesium, neoprene, zinc, potassium perchlorate—Latest plans call for a still further plant expansion in explosives, powder and munitions to cost $500,000,000—Dr. James B. Conant, Harvard President, and Frederick L. Hovde, University of Rochester, appointed members of special three-man mission to Britain to keep United States advised of scientific developments important to national defense—Dr. Edward A. Doisy, St. Louis School of Medicine, to receive '41 Gibbs Medal of the Chicago Section, A.C.S.—Chemical industry fears that technologists and key workmen may be taken in draft—Bureau of Mines announces new magnesium process—Glyco Products opens new Brooklyn plant—National Oil Products completes Cedartown, Ga., addition—Tappi and American Institute of Mining and Metallurgical Engineers hold successful meetings in New York—Government tightens still further control over exports in new order effective March 10—Formal industry-wide priorities placed by OPM on magnesium, nickel—Following a grand jury investigation lasting a year two fertilizer trade associations, 64 corporations and 36 officials of the associations and companies named as defendants in an indictment charging violations of Federal anti-trust laws—Defendants in Government's anti-trust action against nitrogen products manufacturers enter pleas of not guilty—Companies and officials of companies named in magnesium anti-trust indictment also plead not guilty—Dean W. T. Read heads Chemist Advisory Council—Right to exclusive use of the word "cellophane" denied Du Pont in decision in Federal Court, Richmond, Va.—Walter S. Landis nominated for Chemists' Club (N. Y.) presidency—Walter J. Murphy, Editor, Chemical Industries, elected chairman, N. Y. Section, A.I.Ch.E.—Aluminum Co. of America buys half interest in American Magnesium Corp. formerly owned by General Aniline and Film, making American Magnesium a wholly owned subsidiary of Alcoa—War Department and Solvay Process sign contract for construction of an $11,000,000 anhydrous ammonia plant at Henderson, Ky.—Merck to erect new plant at Elkton, Va.—Chemical business in February at highest level in 11 years—Exporters complain of delay in issuing export licenses—Withdrawal of British shipping from Far East causes scarcities in tin, antimony, chrome, rubber, oils, etc.—Chlorine supplies limited—Tartars in spectacular advances—Plastics replace metals in many uses—Standard Oil Development announces new continuous catalytic process for cracking petroleum distillates—New Clinton, Iowa, plant of Du Pont to make cellophane comes into production—Commercial Solvents grants licenses under its patent covering application of lacquers at elevated temperatures—TVA experiments with pilot plant stage of a process for producing alumina from Tennessee white clay—Shell Oil places contract to build butadiene plant at Houston refinery—R. L. Murray elected vice-president in charge of development for Hooker Electrochemical—A. E. Boss named manager, pigment sales, Columbia Chemical Division, Pittsburgh Plate Glass—Deaths: J. J. Greene, Johns-Manville vice-president; Lewis E. Saunders, vice-president, Norton Co.

March

Munitions Board for first time releases to public critical list of products including anhydrous ammonia, chlorine, cotton linters, etc.—Constant additions swell list of products under export control—Labor trouble, largely jurisdictional disputes between CIO and AFofL slow down defense production—Dr. Alexander Silverman, University of Pittsburgh, receives Pittsburgh A.C.S. Section's annual award—16th Annual Banquet, Drug, Chemical & Allied Trades Section, N. Y. Board of Trade sets new attendance record—Hercules Powder dedicates Radford, Va., munitions plant three months ahead of schedule—Seventh annual Chemurgic Conference in Chicago stresses importance of farm products in industrial applications in national defense—Sulfoguanidine announced by Cyanamid's Stamford laboratories—William D. Neuberg leaves Neuberg Chemical to form own company—Reynolds Metals begins construction on an aluminum ingot plant at Longview, Wash., to produce 60 million pounds annually—Du Pont's sulfamic acid plant at Grasselli, N. J., nears completion—Most oils and fats added to export control assuring a virtual embargo on these vital products—Shipping shortage grows worse—Chemical production soars to record high levels and non-defense industries begin to feel pinch in supplies—Dr. Linus Pauling, California Institute of Technology, receives Nichols Medal.

April

Strikes still plague defense program—Irving H. Taylor elected vice-president in charge of sales for Michigan Alkali—George F. Smith resigns from Philipp Bros. and opens offices in Lincoln Building—Monsanto holds open house at new plastics addition at Springfield, Mass.—The 101st Meeting of the A.C.S. at St. Louis features technical matters in their relation to the defense plans—Resinous Products and Chemical announces new resin useful in purification of water

—Tremendous demand for nicotinic acid for fortified breads and flours—Packaging Exposition in Chicago stresses problems attending national defense—Expansion in nation's synthetic rubber plants reported—Deferment of technologists favored by Selective Service officials—Manufacturing Chemists Association opposes legislation designed to give government power to acquire through condemnation any patents necessary to national defense program—Potash Co. of America plans enlarged plant capacity for production of muriate of potash—New naval stores act, effective May 1, provides new regulations for enforcement replacing those issued in '38—Southern Agricultural Research Laboratory, New Orleans, opened—Sharples Solvents changes name to Sharples Chemicals, Inc.—Willis J. Kramer goes with Philipp Bros.—Leon Henderson charges chemical prices are too high in several instances—Reilly Tar & Chemical to erect plant at Belle, W. Va.—Rademaker Chemical obtains $300,000 RFC loan to build plant to manufacture dead-burned magnesite—Coal strike cuts into production of certain chemicals—Export control extended to caffeine, casein, cyanides and other products—OPM puts into effect machinery to prevent accumulation of unnecessarily large stock piles—Fertilizer sales five to 10 per cent above last year—Raw materials coming from the Far East register further price advances—Spot prices for many chemicals rise sharply above contract figures—Du Pont announces improved pigments of the titanium dioxide type—Old Chemical Division of the Bureau of Foreign and Domestic Commerce discarded in new set-up—Barrett to increase phthalic anhydride plant at Frankford, Philadelphia—Plastics Materials Manufacturers' Association formed.

II GEMINI May

Washington complains that national defense plans are lagging and OPM asks for 24-hour operation of industry —Industry complains of difficulties attending priority rulings—Henderson asks price ceiling on sulfate of ammonia at last-season's figure—Justice Department reported toning down anti-trust prosecutions where such action would hamper defense work—President in historic fireside chat calls for greater production effort and cessation of strikes—Benjamin O'Shea named president of Union Carbide, and Jesse J. Ricks becomes board chairman—Robert R. Cole elected a Monsanto vice-president—A.I.Ch.E. at Chicago features symposium on national defense—Prof. T. K. Sherwood, M.I.T., receives the William H. Walker Award at meeting—Westinghouse announces Hipersil, an improved magnetic silicon steel—Du Pont announces a new metal deactivator designed to increase the storage stability of petroleum distillates—Mathieson reports development of Textone an oxidizing and bleaching agent—Harry Tisdale, American Dyewood, named chairman N. Y. Section, A.A.T.C. & C.—Dr. Henry G. Knight, Chief, Bureau of Agricultural Chemistry and Engineering, Department of Agriculture, receives American Institute of Chemists' Award at annual meeting in Washington—National Association of Purchasing Agents meeting in Chicago seeks ways and means of cooperating with government's defense program—Victor Chemical starts work on new research building at Chicago Heights—Department of Justice obtains court orders to freeze I.G. assets in United States—Mathieson offers Super-Mafos, a new dishwashing detergent—Commercial Solvents celebrates 21st birthday on May 8—George W. Dolan elected executive vice-president of Mathieson Alkali—General Aniline announces production of carbonyl iron powder and Western Electrochemical reports that potash chlorate will be made July 1 at Los Angeles—Cobalt metal and salts are in production at new $600,000 Niagara Falls plant of Carbide—Koppers marketing ammonium thiocyanate—National Aniline in a million dollar expansion program at Buffalo works—Standard of Louisiana plans a 15 million dollar synthetic rubber project at Baton Rouge —Other construction announced includes a new enlarged refinery for Wishnick-Tumpeer to produce Pioneer asphalt products, a new laboratory for Rumford Chemical, a barite plant for National Lead's Baroid Sales Division and a $5,000,000 manganese ore reduction plant at Lake Valley, N.M., operated by Newalpitt Corp.—B. F. Goodrich reports immediate construction of a new plant near Louisville, Ky., to quadruple production of Koroseal—American Potash & Chemical's Trona plant in its 12th week of strike conditions—Shortages in chemicals are numerous—Shipping conditions remain an obstacle to the progress of the defense plan—Powder metallurgy reported aiding materially in many fields—International Nickel at the request of the OPM asks all employees to take a bonus of one week's pay instead of taking time off—Shortage of chlorine becomes acute—Paint manufacturers experience greatest spring season in history of industry—Portrait of Marston T. Bogert presented to Columbia University—Progress in use of plastics as substitutes hampered by lack of suitable supplies of formaldehyde and phenol—Shortage of formaldehyde caused by shifting of Du Pont's methanol plant to ammonia production—Contract prices on chemicals remain stable but spot quotations soar to new high levels—Major General William N. Porter heads Chemical Warfare Service in place of Walter C. Baker retired on April 30—G.E.F. Lundell, Chief, Chemistry Division, Bureau of Standards, nominated for the presidency of the A.S.T.M.—Deaths: Arthur C. Langmuir; Stanley Warzala, Calco Division of Cyanamid; Milton W. St. John, manager of sales, by-products, Jones & Laughlin.

69 CANCER June

National Fertilizer Association discusses availability of raw materials and necessary shipping facilities at White Sulphur—John A. Miller, Price Chemical, elected president of the N.F.A.—Du Pont completes new experimental station laboratories for pest control research—Over 200 members of the National Association of Insecticides & Disinfectant Manufacturers at Edgewater Beach in Chicago hear experts discuss possible shortages—N. Y. Section, A.I.Ch.E. and Society of Chemical Industry hold outing at the Westport Mill of the Dorr Co.—Drug, medicine and toilet preparations industry gets minimum wage order—Chemical manufacturing industry given priority status for repair and maintenance materials—Philadelphia Quartz celebrates 110th year of service—Niagara Alkali and Electro-Bleaching Gas combine forces under the name of Niagara Alkali Co.—Hercules Powder buys John D. Lewis, Inc.—Government's TNT plant at Sandusky to be expanded with 20 million dollar addition—Philadelphia Quartz of California begins silicates factory at Tacoma—Copperhill, Tenn., to be the site of a 2 million dollar oleum plant—Society of Chemical Industry selects E. K. Bolton, Du Pont to receive '41 award—Gustave Bayer retires from Merck after 46 years service—Durez to add $400,000 addition—Other noteworthy construction notes include an $800,000 addition by Hayden and an $8,000,000 picric acid plant at Marche, Ark.—OPM revamped and "streamlined" somewhat along lines of the old War Industries Board of World War days—Manufacturing Chemists Association at annual meeting at Skytop discusses industry's relationship to national defense—Lammot Du Pont reelected president of MCA—War Department completes plans for new Chemical Warfare manufacturing arsenal at Huntsville, Ala.—Leon Henderson of OPACS reported seeking legislation to put teeth in price control requests—Talk in Washington of a Chemical Price Division in OPACS—Zinc joins list of metals under full priorities—New order puts phenol-formaldehyde resins and several additional chemicals under export control as of July 23—Exporters and spot chemical buyers find it increasingly difficult to get products—G. C. Stephenson appointed sales manager, Tar & Chemical Division, Koppers Co.—E. S. Bissell elected vice-president, Mixing Equipment—Tremendous boosts in plans for production of both magnesium and aluminum announced—Shortages of petroleum on East Coast reported—Deaths: Harry C. Merriam, E. B. Badger & Sons Co.; Edward J. Small, Jr., general sales manager, Rubber Service Department of Monsanto.

July

Chlorine placed on full priority—Report that attempts to unionize chemists at Shell's Emeryville research laboratories reach East Coast—M. L. Crosley made director of research for Cyanamid—J. M. Bowlby elected president, Eagle-Picher Lead—J. Clarke Cassidy becomes president of Niagara Alkali—Du Pont offers explosive rivets—Department of Justice announces that four corporations and seven individuals engaged in various phases of the magnesite industry failed to contest charges of violation of the Sherman Anti-Trust Act and submitted to fines totalling $76,500—Nineteen lime-producing companies in the South ordered by FTC to cease engaging in a "combination or conspiracy to maintain a delivered price system"—Solvay to construct new synthetic phenol plant—No "summer dullness" this year in chemical shipments—Export control extended to important butyl solvents and ethyl acetate as of the effective date of August 1—Our relationship with Japan becomes more acute and importers fear for continuance of products from the Far East—Non-defense industries begin to feel the pinch in shortage of many chemicals—Anti-freeze scarcity feared by Washington—Battelle Memorial Institute plans $160,000 addition—Calcium-silicon placed on priority list—Deaths: Emile Pfizer, president, Chas. Pfizer & Co.; Evald Anderson, technical director, Western Precipitation; Theodore W. Sill, assistant manager of sales, Organic Chemicals Division of Monsanto.

August

In an effort to settle conflict between OPM and OPACS President Roosevelt announces formation of overall agency, the Supply Priorities and Allocations Board (SPAB)—Acute industrial alcohol shortage expected—Problem of shortage in chemical containers comes out into the open—Price ceiling placed on formaldehyde—ICC changes regulations on transportation of dangerous articles—W. N. Williams made assistant to the president of Westvaco, and J. Rivers Adams becomes manager of sales—R. N. McAdams is elected secretary of Hercules—Chain Belt, Milwaukee, celebrates 50th anniversary—F. C. Baker elected president of American Potash & Chemical—Commercial Solvents awarded Government contract for erection and operation of a $10,000,000 anhydrous ammonia plant at Sterlington, La.—Other new plants reported to be erected shortly include the following—a $17,000,000 ammonia plant for the midwest with Hercules operating; a $27,000,000 shell-loading plant near Parsons, Kan., with Johns-Manville in charge for War Department; a $51,000,000 government powder plant near Tulsa with Du Pont as operator—Production of TNT starts at $48,000,000 Kankakee Ordnance Works, Joliet, Ill., the largest high explosives manufacturing plant in the U. S.—Basic Refractories will construct in a contract with Defense Plant Corp. a chlorine unit at the $63,000,000 magnesium project in Nevada—General Chemical plans a million dollar expansion including remodeling old National Aniline plant at Marcus Hook, Pa.—U. S. Rubber breaks ground for a 10,000 ton-a-year synthetic rubber plant at Naugatuck, Conn., one of the four such plants planned by Defense Plant Corp.—John W. Boyer joins alkali and chlorine section of OPACS—Aluminum Co. of America closes contract with DPC for construction and operation of an alumina plant in Arkansas with annual capacity of 400 million pounds—Contract also calls for three aluminum smelting plants, Massena, N. Y., another in Portland, Oregon area and third in Arkansas—Trona strike finally settled—Paper manufacturers to take deep cut in chlorine supplies—New export control regulations announced for alcohols and glycols and other chemicals and metals—Henderson insists mercury price (around $192 a flask) is too high—Phenols and toluol under full priority control—OPM moves to control speculation in fats and oils—New hydroelectric power developments particularly in the Far West become increasingly important in location of new defense plants—Whiskey distillers are to be asked to produce industrial alcohol from corn to relieve shortage—DPC concludes contracts with Dow for further increase in magnesium output at Freeport and with Diamond for a plant at Painesville, Ohio—Heated controversies feature reported shortage of petroleum products on East Coast—Laboratories engaged in scientific research obtain a blanket priority rating of A-2 from OPM—Deaths: D. D. Jackson, Columbia; August Eimer.

September

Chemical Salesmen celebrate 20th anniversary of their association at three-day meeting at Shawnee-on-Delaware—Congress insists on full consideration of proposed price control bill—Emphasis at OPM begins to shift from priorities to a program of allocations—Semi-Annual A.C.S. meeting at Atlantic City featured by controversial statement issued by Society directors on professionalism vs. unionism for chemists and chemical engineers—Thomas Midgley receives Priestley Medal—Alcoa cleared of monopoly charges after record four-year court case—Treasury Department denies application of General Dyestuff to acquire control of General Aniline & Film—Chemical Warfare Service's plant at Monsanto, Ill., being constructed by Monsanto Chemical nears completion—Tappi Medal goes to Robert B. Wolf—Additional magnesium plants announced by DPC include one at the Lake Charles plant of Mathieson and another to be constructed and operated by International Agricultural at Austin, Tex.—Hydrocarbon Chemical & Rubber changes to Hycar Chemical—Hercules places new plant in operation at Hattiesburg to make rosin esters—Penn. Salt and Cyanamid form subsidiary to operate bauxite mine in British Guiana—Hycar Chemical will construct and operate a synthetic rubber plant at Louisville, Ky., for the DPC—Sherwin-Williams will build and operate a bomb and shell loading plant at Marion, Ill., it will be known as Illinois Ordnance Works—E. C. Williams, formerly of Shell Development goes with General Mills—Chemical price control reaches out into an imposing list of materials, including methanol effective Oct. 10—Lend-lease help to Britain, China and Russia cuts into available supply of chemicals—Engineering Defense Board set up by the several engineering societies including A.I.Ch.E.—Department of Justice moves against "priority profiteers"—Paint manufacturers experiment with new formulae developed to conserve strategic materials—United States agrees to buy one hundred million dollars worth of minerals from the Soviet—Robert W. Cairns appointed to directorship of Hercules Experiment Station.

October

President Roosevelt signs Property Seizure Bill—CHEMICAL INDUSTRIES Buyer's Guidebook Number adds an Equipment and Container Buying Section—Roy C. Newton elected a vice-president of Swift & Co.—Paint Industries Chicago Convention and Paint Show attracts record attendance—Martin H. Ittner to receive '42 Perkin Medal—Consolidated Chemical Industries plans $560,000 plant expansion at East Baton Rouge Parish—Du Pont and Goodrich building synthetic rubber plants at Louisville—Hycar is also constructing a rubber plant in the same city—Du Pont will produce chlorinated hydrocarbon solvents at new plant at Wyandotte, Mich.—ACS appoints Committee on Economic Status to foster sound relationships between chemical employees and employers—Ninth Annual Convention of the National Pest Control Association held in San Francisco attended by record number—OPM curtails use of cellophane in many fields—OPACS work towards a price ceiling on oxalic—Synthetic and coal tar phenols, cresols and similar acids employed in the manufacture of plastics are to go on complete allocation as of Nov. 11—Cobalt metal and salts also go under direct allocation control of OPM—Ceiling prices on glycerine are to go into effect on Nov. 10—Tempo of defense production begins to swing into high gear—Dow Chemical gains "Chem & Met" Award for its

(*Continued on page 96*)

Immediately Available—

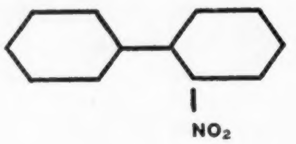
these two useful, low-priced intermediates!

Here are two low-priced intermediates with great potential value—in new applications and to replace hard-to-get materials.

o-Nitrodiphenyl technical—available immediately in plentiful commercial quantities at 6¢ a pound—is useful in some applications as an alternate for substituted and unsubstituted nitrobenzenes.

o-Aminodiphenyl technical—equally plentiful at 12¢ a pound—can relieve the shortage of aniline oil for many manufacturers. It also may be used in resin compositions and in the manufacture of dyestuffs of the quinoline yellow and Hansa yellow types.

For samples, fill out and mail the coupon below. Monsanto Chemical Company, Organic Chemicals Division, St. Louis, U. S. A.



Molecular Weight: 199

o-NITRODIPHENYL

(Technical)

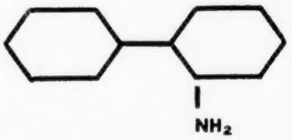
Appearance: Light yellow to reddish crystalline solid

Crystallizing Point: 34.5°C. Min.

SUGGESTED USES:

1. Intermediate in chemical synthesis. May be partially reduced and rearranged to give 2, 2'-diphenyl benzidine (NH_2=1).

2. Further nitration will give a dinitrodiphenyl which may possess interesting properties as a dyestuff intermediate.



Molecular Weight: 169

o-AMINODIPHENYL

(Technical)
(o-Phenyl Aniline)

Appearance: Purplish crystalline mass.

Crystallizing Point: 47.0°C. Min.

SUGGESTED USES:

1. In resin compositions.

2. In dyestuff synthesis to produce dyestuffs of the quinoline yellow series characterized by their fastness and a shade of yellow having a green tone. (U. S. Patent 2,211,662).

3. In the production of Hansa yellow dyestuffs through o-phenyl-aceto-acetanilid.

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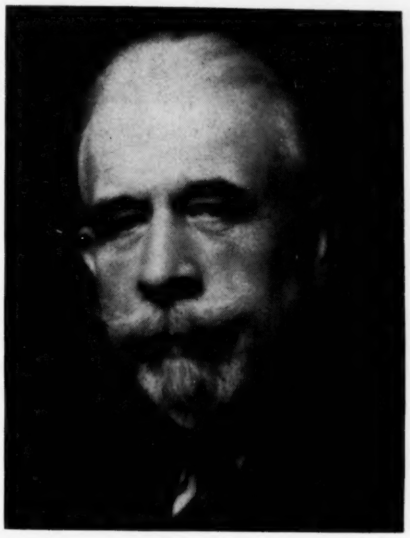
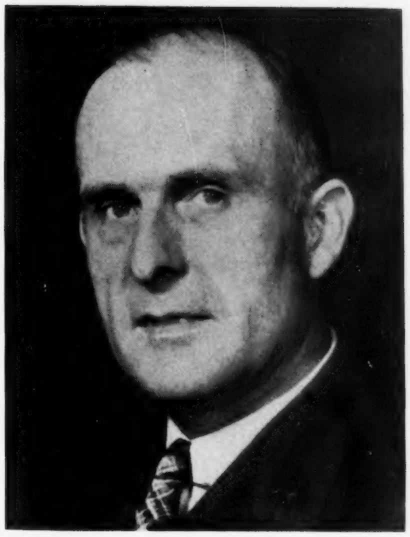
*Firm*____________________

*Address*______________ *City*__________

Headliners in the News

Right, Pinckney L. (Jack) Frost and Donald S. Cushman, newly-appointed manager of sales and assistant manager of sales, respectively, for Innis Speiden & Co., N. Y. City. Mr. Frost fills the vacancy left by the death of H. Gordon MacKelcan. He started with the company in 1921 working from office boy to the managership of the Cleveland branch. In 1933 he was made assistant manager of sales at New York. Mr. Cushman who fills Mr. Frost's old position, was employed by the company in Cleveland in 1928 and became branch manager in 1933.





E. A. Turner, for more than 15 years in charge of Monel and rolled nickel sales in the chemical and associated fields for International Nickel Co., has been made assistant to sales manager J. F. McNamara.

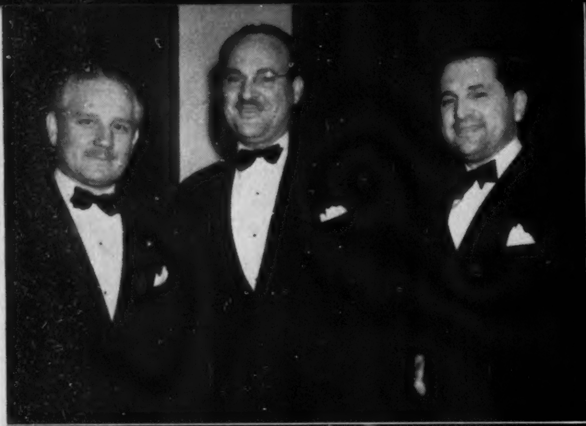
Dr. Harrison E. Howe recently completed 20 years as editor of *Industrial and Engineering Chemistry.*

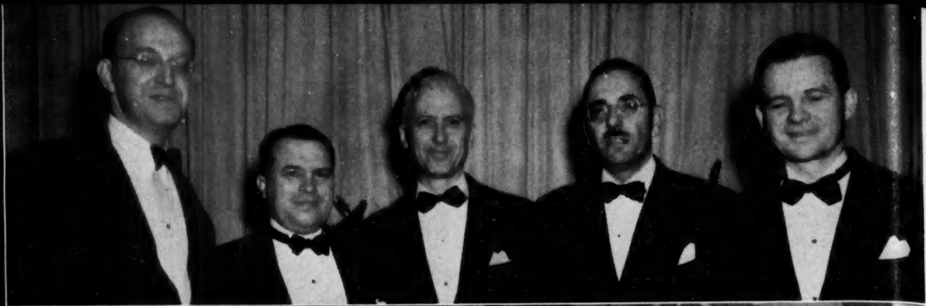
Dr. Per K. Frolich, director, Chemical Division, Esso Laboratories, has been elected president of the American Chemical Society for 1943.

Percy C. Magnus, president of Magnus, Mabee & Reynard, Inc., has been elected president of the N. Y. Board of Trade.

Stuart M. Campbell has been appointed comptroller of the Pittsburgh Plate Glass Co., starting Jan. 1, 1942.

Thomas S. Nichols, vice-president of Prior Chemical Corp., is now a consultant to the Inorganic Chemical Section, OPM.



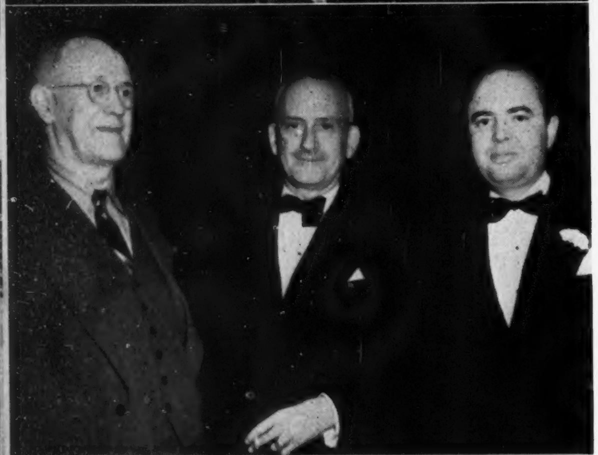


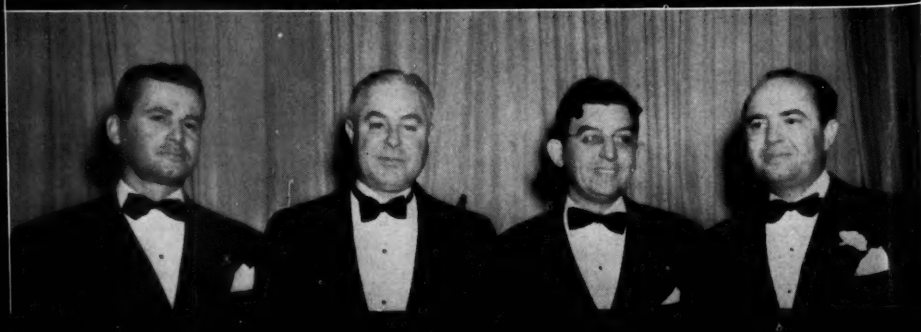
Associated Drug & Chemical Industries of Missouri Holds Second Annual Christmas Party at St. Louis

ASSOCIATED Drug & Chemical Industries of Missouri held its 2nd annual Christmas party Dec. 17 at the Hotel Chase, St. Louis. In addition to other gifts, there were distributed 10 Defense Bonds and a presentation of $250 was made to the Red Cross. On this page are a few pictures taken at the party.

Top left, Joe Noh, McKesson & Robbins; Glenn O'Neill, Dow Chemical; and Wes Harrison, DuPont (Grasselli). *Below that,* J. S. Brewer, T. M. Sayman Co.; Mrs. T. M. Sayman and "Doc" Deckert, St. Louis Candle & Wax Co. *Left center,* "Doc" Sizemore, St. Louis Perfume Co.; Jack Ueasey, Merck & Co.; and F. A. Barada, Fritzsche Bros. *Below that,* F. A. Woods, Owens-Illinois Glass Co.; Fred Sultan, Od Peacock Sultan Co.; and Charles Heer, Luyties Pharmaceutical Co. *Bottom left,* James F. Ballard III, James F. Ballard Co.; Clarence Case, Case, Voyles, Case; and David B. White, James F. Ballard Co.

Top right, M. S. Koblish, General Chemical Co.; "Shorty" Wyatt, Warner Chemical; Joe Sharkey, Western Cartridge Co.; Morton Meyer, Thompson-Hayward Chemical Co.; and R. S. Reamer, Wm. R. Warner Co. *Below that,* Paul Weber, Chas. Pfizer & Co.; Harry Dahm, G. S. Robins & Co.; Jack Varley, Baird & McGuire; and Cliff Iorns, C. H. Iorns Co. *Below caption,* F. A. Barada, Fritzsche Bros.; Al Grosch, Aluminum Co. of America; F. A. Woods, Owens-Illinois Glass; M. Johnson, Solvay Sales Corp.; Morton Meyer, Thompson-Hayward; P. A. Hein, Mallinckrodt Chemical; M. E. Heimann, American Can; and G. K. Robins, G. S. Robins & Co. *Bottom right,* Roy Shaneman, Pennsylvania Salt; King Harrigan, Meyer Bros. Drug Co.; Harold Cummings, Mallinckrodt Chemical; and F. A. Barada, Fritzsche Bros.





United Carbon Co. Opens New Building at Charleston, W. Va.

United Carbon Co. recently opened its new half-million-dollar modern building on the banks of Charleston's famed Kanawha River. Impressive ceremonies marked the opening. Pictured above are some shots taken inside and outside, including the private dinner room, reception room, lobby hallway, bookkeepers' room and elevator doors.

To the left is a complete view of the new building taken from the bank of the Kanawha. Below, Miss Anna Marie Nelson, daughter of Oscar Nelson, president and general manager of the company, pictured at the dedication ceremonies with her father (left) and Charles E. Hodges, master of ceremonies. Miss Nelson unveiled the bronze statue on the entrance portico.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Alkali Specification
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ALKALI
DIAMOND ALKALI COMPANY PITTSBURGH, PA., and Everywhere

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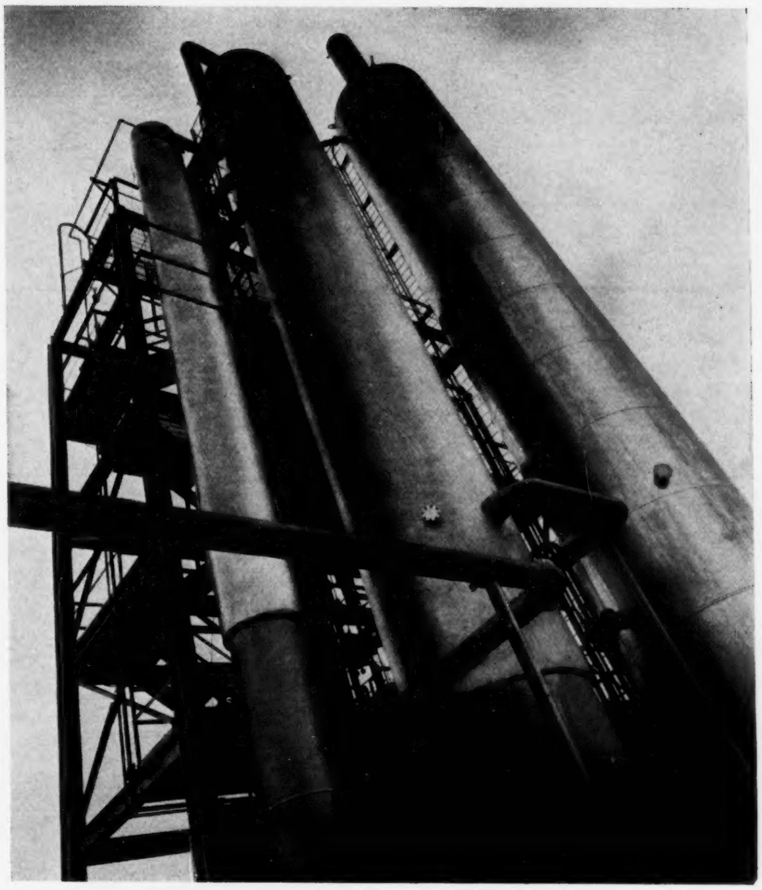


New Goodrich Solvent Recovery Unit

B. F. Goodrich Co., Akron, now is operating this solvent recovery unit at its recently opened Koroseal spreading plant. Koroseal is the synthetic elastic made from plasticized polyvinyl chloride. An idea of its size may be gained from the fact that the largest tower (on the right) is 10 feet in diameter, 78 feet high, weighs 130,000 pounds.

DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS

EQUIPMENT HIGHLIGHTS

At the Chemical Show

Last Month's Exposition of Chemical Industries served not only as a review of the progress of the past two years but as a means of clarifying for many the problems arising out of the nation's all-out production program. Herewith are some of the highlights.

THE chemical industry took a brief time out last month to review two years of progress and to catch the trends for the future at the Eighteenth Exposition of Chemical Industries, Grand Central Palace, New York.

The Exposition this year proved a particularly stimulating week for the executives and engineers who attended from all parts of the country. The interchange of ideas and the information obtained on savings and short cuts derived from new or improved materials, methods and equipment and the more efficient utilization of existing facilities should help to clarify the many problems existing in the industry's all-out production program.

The keen interest of chemical industrialists in taking advantage of the exposition as a source of speedup ideas was reflected in the increased attendance which was approximately 48,000, better than ten per cent. more than the attendance at the 1939 Exposition.

The attendance this year was high not only in numbers but in interest. More than ever before it seemed that the Exposition was for the technical man who had a problem to solve.

Three floors of the Grand Central Palace were occupied with the products and displays of 340 exhibitors. Some time before the show it was feared that many exhibitors would not be able to display machinery or equipment because of the pressing demand for filling orders. However this difficulty was overcome to a large extent by the manufacturers' borrowing equipment from people who had already bought it and then having it shipped to plants direct from the exposition. Some manufacturers who were even too pressed to do this designed attractive and informative pictorial or diagrammatic displays and had engineers on hand to discuss processing problems.

Much of the progress during the two years that have elapsed since the last Exposition appeared to be in modifications and improvements to existing equipment rather than to the development of radically or fundamentally new principles.

Some of the developments noted at the various booths are described below.

The Ingersoll Steel & Disc Division of the Borg-Warner Corp. showed a novel sun shade which it claims lets in only 15 to 20 per cent of sun heat. The shade was developed by Dr. J. J. Grebe of the Dow Chemical Company.

The screen might be compared to a miniature bronze Venetian blind with fixed adjustment.

As shown in the diagram the vanes are laced together with wire to a rigid position at 17 degrees to the horizontal. With this slope the shade keeps out all sun rays above 40 degrees with the horizontal.

The new screen which is called "Koolshade" is being used industrially on buildings and outdoor tanks to reduce the sun load. It is also being used as window screens and is said to be as effective in keeping out insects as 18 mesh wire screens.

The Huber Pump Division of the Downingtown Manufacturing Co. displayed a new pump operating on a "squeegee principle" which is unlike a centrifugal, rotary, reciprocating, screw or diaphragm pump. Briefly it consists of a flexible rubber tube which is alternately squeezed and released in a rocking, squeegee manner so that the liquid or gas is "breathed" into and out of the tube. The liquid or gas being pumped is totally enclosed within the tube at all times and thus cannot come in contact with any metal part of the pump. The tube can be made of gum rubber and various acid and oil resisting synthetic materials to prevent corrosion and contamination. High percentage of solids, high specific gravity of solids or solutions and viscous or stringy solutions are safely handled. The "Squeegee" pump is said to have a high efficiency and a positive action with little slippage.

The Squeegee operating principle consists of a rotating drive shaft keyed to an off-center rotor which itself is keyed to an adjustable eccentric, the adjustments providing take-up for wear on the tube. The shaft and both rotors all turn as a unit inside the compressor ring thus pushing the ring out radially against the tube. This action continues progressively along the curved portion of the tube producing a rocking squeegee action from suction to discharge sides. Compression of the tube advances the liquid or gas, while expansion of the tube back to its normal diameter produces a high vacuum which inhales more liquid, which will be exhaled in the following cycle of the pumping action.

Premier Colloid Products, Inc. advances the application of the colloid mill principle to the emulsification and dispersion of liquids and solids by a newly developed laboratory colloid mill shown for the first time at the exposition. The company claims that the new mill although only 8⅛" by 18", will produce the same quality and uniform product as the larger commercial units. It operates on 110 volts, A.C. or D.C., ½ H.P. motor with maximum speed of 13,500 r.p.m.

F. J. Stokes Machine Co. showed several of their outstanding developments of the past two years. One of these achievements by the Stokes engineers on display was the high vacuum equipment, operating within the low micron range, for the large scale production and preserving of human blood plasma.

Blood plasma is used as a substitute for whole blood in transfusions. It is an effective remedy in cases of "shock," restoring blood volume instantly. It is said to be saving a great many lives in war-torn parts of the world.

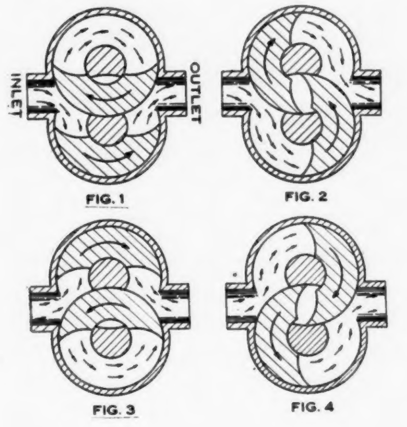
The Dessivac apparatus consisting of a vacuum dryer and other accessories was shown in operation demonstrating the principle of drying from the frozen state under high vacuum.

Stokes also showed its latest completely automatic plastics molding machine.

Sprout-Waldron & Co. claims that its comparatively new "Perfect Circle Sifter" has demonstrated many particular abilities. In this machine the screens or sieves are mounted in a box which is

swing with a perfect circular motion. Dead spots on the screen surface are said to be eliminated and "up ending" of slivery particles prevented. The sifter can be fabricated out of black iron, aluminum, stainless steel, etc., and clothed with wire or silk cloth.

The Bump Pump Co. had on display a positive rotary type pump which does not depend on high speeds for non-fluctuating delivery. It operates at low speeds and is said to eliminate any possibility of agitating or churning of the product being handled. The method of operation is shown in the illustration. The product is drawn into the inlet side of the pump through a positive vacuum suction and is discharged through the outlet side by means of a positive piston-like action.



The product which is drawn into the inlet side of the pump is handled only once and because of the seal between the two rotors the material does not return to the pumping chamber thus avoiding churning or agitation.

The pump is said to find particular application in the food, dairy, ice cream and cosmetic industries.

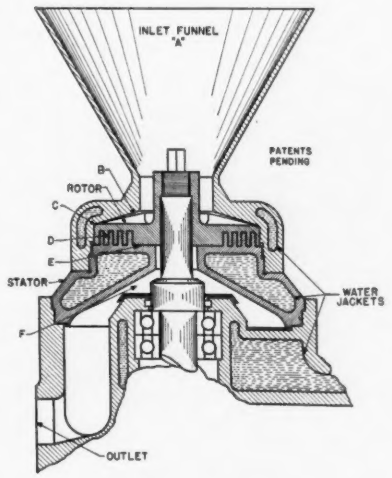
Blaw-Knox Company in an illuminated functional exhibit illustrated its new "turn-key" plant service for the chemical and process industries. The scope of the enlarged Chemical-Process Equipment Department of the company now embraces complete development and construction of new plants or processes, together with initial operation, under one responsibility. The exhibit showed one recent work of this department in the recovery of the methyl-ethyl-ketone used by the B. F. Goodrich Company as the solvent for Koroseal used in preparing solutions for the coating of fabrics. The essentials of the process were displayed on a large flow diagram, or blueprint. Lights showed the flow of materials and illumination was synchronized with a moving tape description of the operation of the plant.

C. O. Bartlett-Snow Co. displayed a new triple action colloid mill of unique construction which was developed after a thorough study of the factors involved.

According to the company, colloid mills, through popular acceptance and wide usage, have come to be defined as "machines whose functions are to disintegrate, disperse, emulsify and mix, otherwise immiscible materials." A true colloid mill should be capable of so reducing the particle size of the materials being treated that they will remain in suspension without separation or settling for long periods of time. In achieving stability of emulsions or dispersions it is sometimes necessary to resort to the use of various chemicals, gums, etc., but it is the responsibilty of the colloid mill to produce the initial fineness of dispersion or emulsification. The fineness of emulsions or colloidal suspensions depends on the amount of "shearing" which the particles or globules in the mixture receive. Whether this is brought by sudden violence such as is said to have produced the emulsions found in the oil fields, or to the slow grindings of thousands of centuries is of little moment. It matters little whether the dispersions are produced by hydraulic or attritional shear providing only the amount of shear has been sufficient.

The rotor, or the rotor and stator, are the most important parts of a colloidal mill. It is in the design and operation of these that the new Bartlett-Snow mill is said to differ from earlier types. In previous designs the material enters at the center of the rotor, is pushed across the face of the rotor or centrifugal force, and discharged over the periphery. According to the company this results in formation of thin spots creating aeration and foaming. It is also said that the centrifugal force is not a constant propelling factor, as its effectiveness varies with the viscosity, specific gravity and other characteristics of the material being handled.

The new Triple Action Mills employ a unique design of rotor and stator. The



material, see diagrammatic view, is fed downward through the receiving funnel "A" and encounters at "B" the impellers or vanes on top of the rotor. Since the rotor travels at high r.p.m. these impellers or vanes set up considerable centrifugal or pump-like action in the inlet chamber, forcing the material to the periphery of the rotor at pressures which range up to 150 lbs. per sq. in. under certain conditions. The periphery or side of the rotor is set against the housing of the machine at very close clearance, "C" on the diagram. The material is processed down through this clearance.

The bottom of the rotor and the top of the stator are provided with a series of close fitting interlocking rings, "D" on the diagram, the pressure set up in the machine drives the material against centrifugal force from the periphery of the rotor and stator to the center through the rings thus subjecting it in a second processing to many shearing impacts per minute. Finally, still being driven against centrifugal force and thereby crowded into smaller and smaller space as it approaches the center (instead of fanning out into larger and larger areas) the material is forced, "E" in the diagram, over the smooth area between the rotor and stator. After this third processing action the material is discharged from the chamber "F" through the side discharge outlet.

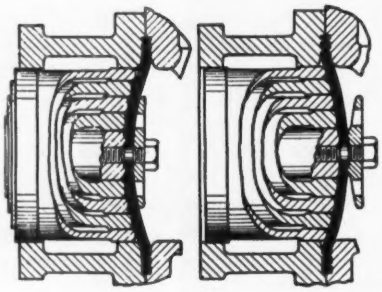
Lee Metal Products Co., Inc. showed a new steam jacketed kettle called the Center Line Scraper because of an offset in the frame to which the paddles are hinged, and which causes the paddle blades to work along the exact diametrical center line of the bowl. This allows the scraping action to be continued down to the rim of the outlet pipe.

Because of the offset in the paddle frames no springs are necessary to hold the paddles out against the kettle. The weight of the material keeps them pressed firmly against the side of the kettle as they revolve.

Merco Nordstorm Valve Co. featured Merchrome coated valves, a new development in hard facing, whereby interior valve parts are armored with an impenetrable, welded surface that is said to provide extreme resistance to erosion and corrosion.

The Reineveld Corp. showed new developments in horizontal centrifugal filters and separators with automatic control of operation. The feature of the design is that the main bearing is located at the center of gravity of the revolving mass. This line of machines was formerly made only in Holland but has been adapted to American methods and is now being made here in large capacity, high speed models.

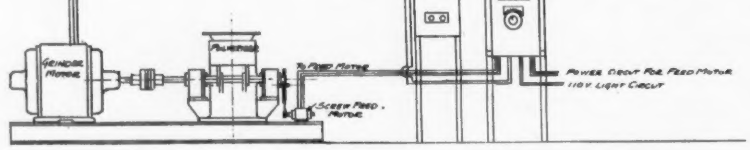
T. Shriver & Co. had a double acting piston pump of the positive displacement type delivering large volumes at high pressures. As illustrated, the pistons consist of a series of concentric rings each mechanically actuated to produce a different length stroke. Heavy rubber (or synthetic rubber) diaphragms separate the working mechanism from the two liquid



ends. The maximum throw of the piston is in the innermost ring; the minimum in the outermost. At the end of the pressure stroke the piston rings shape the diaphragm to the form of a convex surface of a sphere. At the end of the suction stroke the drawback disc on the face of the diaphragm, in conjunction with the piston rings, shapes the diaphragm to a concave surface of the same sphere. Thus the diaphragm is supported by the pistons at every stage of both suction and pressure strokes.

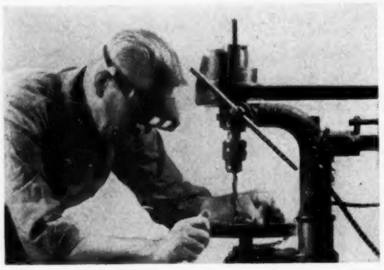
The company recommends the pump for use with abrasive, viscous, delicate or hazardous materials.

Gruendler Crusher and Pulverizer Company featured its new Super Master Pulverizer for extra fine grinding of nonabrasive, free-flowing materials. In conjunction with this the company also showed its recently developed Mosher Automatic Feed Control. This automatic control enables pulverizing machinery to be operated at maximum capacity under all conditions of material or load. Operation is said to be made fool-proof. It is claimed that clogging, overloading, overheating, burnt out motors and overloading of grinders are prevented. At the same time it is also claimed that the machine operates at the highest possible load and the average increase in capacity is about 30 per cent.



WIRING DIAGRAM FOR MOSHER AUTOMATIC FEED CONTROL

Edroy Products Co. displayed the Magni-Focuser Eye Shade pictured here. It is equipped with five power prismatic lenses. Although designed primarily for



use by professional photographers it might come in handy to many chemists or other technicians for manipulation of small apparatus or tools.

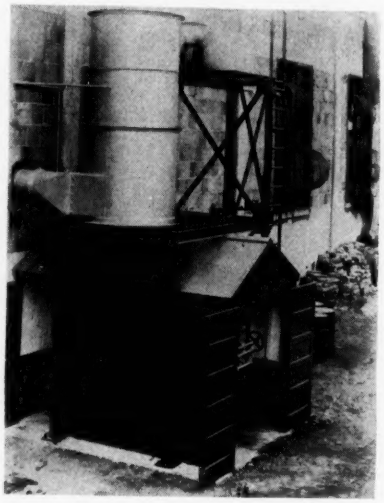
National Carbon Company displayed for the first time its new centrifugal pump made of Karbate (trade mark for a carbon or graphite base material impervious to seepage of fluids under pressure). The pumping unit is constructed in such a way that all parts coming in contact with the fluid being pumped are made of this material which is highly resistant to the action of most acids, alkalies and other corrosive materials. It possesses good mechanical strength and excellent resistance to thermal shock.

General Ceramics Company featured several new products. One of the most noteworthy is a fine-grained porous ceramic ware used for electrolytic diaphragms. In order to avoid the necessity of making changes in cells and other accessory equipment, these diaphragms are made comparable in pore volume, pore size, electrical resistance and other physical properties to those formerly imported and have the advantage of greater mechanical strength.

Another product on display was stoneware with a thermal conductivity three or four times that of the regular ware. The enhancement of this property is accomplished by replacing the siliceous material in the body by silicon carbide and overcoming the usual increase in porosity by such addition. This ware is almost as dense as the regular grade of stoneware.

A novelty exhibited for the first time at this exposition is a new material for laboratory table tops. Introduced under the name "Cerastone" the new product is a selected natural Ohio sandstone that has been autoclaved to render it nonporous.

Claude B. Schneible Company demonstrated some improvements in dust collecting. The Unit Type Dust Collector featured is a complete collection system



combined in a single unit consisting of fan, spray curtain wet method collector tower, pump, settling chamber and motorized sludge ejector-conveyor.

Proctor & Schwartz, Inc. featured its new Aero-Form continuous drying system for wet-solids. The new system is said to bring many benefits. Drying may be successfully linked with processes that precede and follow in one uninterrupted chain.

Additional information on these developments may be secured by writing to Chemical Industries.

Other highlights of the show will be given next month.

Industry's Bookshelf

Protective and Decorative Coatings. Volume I by Joseph J. Mattiello, Ph.D., John Wiley & Sons, Inc., New York, 819 pages, $6.00. Reviewed by William L. Hale, The Debevoise Co. This comprehensive work gives the basic data and information on the raw materials for varnishes and vehicles. Volume I covers the oils, the resins, driers, thinners and solvents, natural minerals, and ethers. Volumes II and III, which have not been published as yet, will cover pigments and manufacturing and special studies.

Scope

Because of scope of the field of protective and decorative coatings, which includes paints, varnishes, lacquers and inks, the editor has had each chapter written by a recognized specialist.

The introductory chapter on The Paint and Varnish Industry is excellently written by William Howlett Gardner, Alfred E. Rheineck, James S. Long and Henry A. Gardner. It traces the history of industry from the prehistoric art to the present day science and what may be expected in the future.

Contents

Each chapter gives the history of the particular product, complete tables of the physical and chemical properties, along with the methods of testing and treating, and typical formula for usage. The chapter on drying oils is handled by Sorensen, that on Cashew Nutshell Liquid by Damitz, Oiticica Oil by Mattielo, Castor Oil by Priest, Economics of Drying Oils by Bonney, Rosin by Powers, Phenolics by Moore, Alkyd Resins by Ferguson, Urea-Formaldehyde by Hodgins, Hovey and Ryan, Acrylic Resins by Pearce, Petroleum Thinners by Stewart, etc. Each man the foremost in the particular field.

Valuable Reference

The book is well written and is not only a valuable reference to the experienced technician but also to technically trained graduates who enter the industry.

Dr. Mattiello is particularly well suited to have edited this work because of education and years of successful manufacturing experience. He is highly respected by those in the the industry as well as those in scientific circles.

Foreign Literature DIGEST

By

T. E. R. Singer

REVISTA DE AGRICULTURA (Puerto Rico) Vol. XXXIII, No. 3 (1941) p. 422.

Fusel Oil in Rums: The amyl alcohol and other higher alcohols in rum give the latter a nauseating taste and odor when present in considerable quantity, and this has led to the belief that they also have an ill effect on the health of the user. It has been proved recently that fusel oil is no more harmful to the organism than ethyl alcohol itself. Nevertheless, the present tendency is to eliminate fusel oil from rums as much as possible.

There are two methods for avoiding a too high content of fusel oil in commercial rum, the first consisting of its total or partial elimination during distillation, the second tending to avoid or prevent the excess formation of this fusel oil during fermentation. The author, Rafael Arroyo, is of the opinion that the second method is the more efficient, since the first also involves the elimination of other substances which are necessary to commercial rum, such as "Rum oil" and the more valuable esters. This second method is therefore the main subject of the report under consideration.

Three chief points must be kept in mind in using this method:

1. The selection of a yeast which is naturally a poor producer of fusel oil;
2. Maintenance of low fermentation temperatures;
3. Providing the yeast with a sufficient supply of nitrogen in the form of ammonium salts, such as the tartrate, citrate or sulfate or using ammonium hydroxide directly.

Experiments were then conducted to determine the best conditions. A table gives data on the yield of fusel oil in each of a number of batches of rum fermented with 11 different kinds of yeast under the same conditions. A second table gives the effect of the fermentation temperature on the production of fusel oil. A number of different yeasts were used with two different temperature ranges, 33-35°C. and 25-27°C. Using the latter temperature range, the production of fusel oil can be reduced 40-60% as compared to the 33-35° range. A third table gives data on the production of fusel oil during fermentation with various yeasts with and without ammonium hydroxide treatment, and with ammonium hydroxide treatment at 33-35°C. and at 25-27°C. A combination of relatively low temperature and treatment with ammonium hydroxide gives the best results in regard to low fusel oil content. Moreover, when these methods were applied in practice it was found that there was less contamination of the product, the yields of alcohol were higher, the rum was of better quality and the product matured rapidly in the casks.

BUMAZHNAYA PROMYISHLENNOST (Paper Industry) 4, (1941) p. 48.

Utilization of the Slurry from the Purification of Waste Waters. Experiments were conducted by A. Samishkin and A. Testov on the utilization of slurry from the waste waters of paper factories. The slurry contained from 1.5 to 2% of absolutely dry material with an ash content of 37%. 20% of the slurry content was good fiber and 80% consisted of mill wastes, clay, lime and alums. For the experiments the slurry was mixed with varying proportions of crude wood pulp fiber and other similar materials. These experiments, for which numerical data are given, show that the addition of slurry to fresh fiber does not decrease the mechanical strength of the batches, if 55% slurry is used with the crude wood pulp and 70% with the cellulose. The slurry could be used as a substitute for the clay to some extent.

THE CHEMICAL TRADE JOURNAL AND CHEMICAL ENGINEER (London, England) Vol. 109 (1941) p. 281.

The commercial production of hydrogen peroxide from petroleum gases is indicated in E. P. 540,534 of 1941 (accepted Oct. 31, 1941) that has been granted to the Royal Dutch Petroleum Co. The Dutch workers have found that by close control of the reaction conditions quite high yields of the peroxide are obtainable. From 100 parts by weight of propane, for instance, 40 parts by weight of hydrogen peroxide can be obtained. All gaseous saturated aliphatic hydrocarbons with two or more carbon atoms and also saturated alicyclic hydrocarbons can be so oxidized that hydrogen peroxide is the main product.

New Equipment

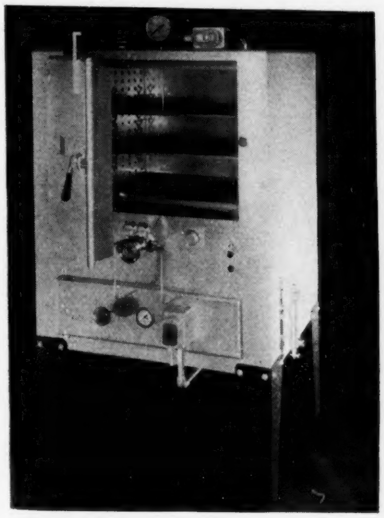
Explosion-Proof Cabinets QC 153

The Precision Scientific Company has announced a new series of four standard sizes of explosion-proof constant temperature cabinets, approved by Underwriters' Laboratories, Inc., for use in hazardous locations, Class I, Group C and Group D, in which flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are manufactured, used, handled, or stored in other than their original containers. Class I, Group C, relates to atmospheres containing ethyl ether vapor. Class I, Group D, relates to atmospheres containing gasoline, petroleum, naptha, alcohols, acetone, lacquer, solvent vapors, and natural gas.

Explosion-proof features embrace complete absence of exposed contacts, electric controls, switches, or wiring terminals, so as to prevent ignition of explosive gases in the atmosphere, or inside the cabinet; safety release latches on doors, for instant opening under the pressure of an explosive burst which might occur inside the cabinet; also special venting to exhaust dangerous gases.

Steam, instead of electricity, is used for heating, and a motor-driven turbo-blower produces a forced circulation of heated air across the working chamber.

Temperature range is 35 to 150°C., automatically controlled by a pneumatic thermostat which opens or closes an air-operated steam valve to control the steam



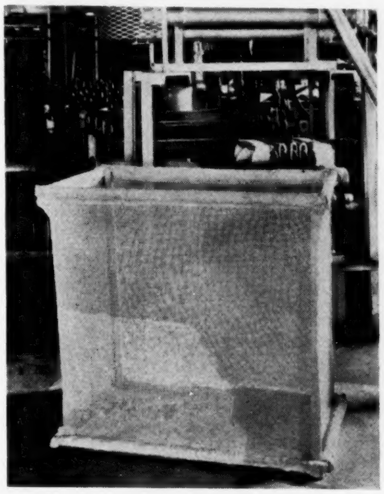
supply. Control accuracy is between plus or minus 2° and 3°, depending upon operating temperature.

The cabinets can be operated at any steam pressure between 0 and 100 lbs. saturated. Operating temperature is governed by steam pressure, and cabinets are automatically safe-guarded against excessive temperatures by a pressure release valve set to release at 100 lbs.

Plating Tank Nets QC 154

A new aid to electroplating practice has been placed on the market by Hanson-Van Winkle-Munning Company. The device is the HVWM Tank Net. These nets are placed in plating tanks so that any work dropped may fall into the net and thus be easily recovered by simply lifting the net out of the solution.

The net is made of ½" stretched mesh, hung square, 6 thread medium twine, made to dimensions as specified. Tape is sewn in form of loops along top and bottom of both ends and sides large enough to accommodate a rod up to 1½" in diameter.



These nets can be used in nickel, cyanide copper, Mazic zinc, acid zinc and cadmium solution to advantage. They are not suitable for alkaline cleaners or sodium stannate tin solutions.

A large camera manufacturer, and two optical concerns have been using nets of this type for the past two years in 9H nickel solutions with satisfactory results. These concerns plate mostly brass, copper and die cast parts which, when dropped to the bottom of the tank cannot be recovered with a magnet. They report that contamination and consequent poor plating has greatly decreased with the use of these nets.

Power Truck QC 155

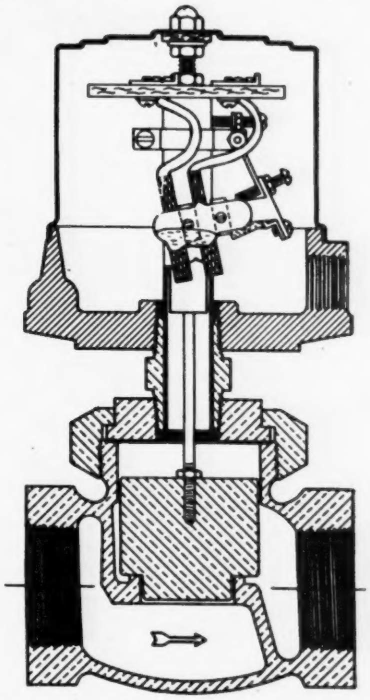
To meet the demand for light weight power trucks that would lift and carry loads weighing up to one ton, Clark Tructractor Division of Clark Equipment Co., has developed a compact, fork type truck that incorporates many desirable features. Christened the "Clipper," these trucks are offered in six models, capacities 1000, 1500, 2000 lbs. with standard finger lifting heights of 60 to 108 inches, other special heights optional.

Gas-powered for 24-hour continuous service the truck has a four cylinder industrial truck engine, front wheel drive, rear wheel steer, hydraulic lift and tilt.

Self starter and hydraulic brakes are standard equipment. The driver rides on a spring suspended seat with all controls within reach. Speeds are from one to seven miles per hour forward or reverse.

Flow Alarm QC 156

The Magnetrol Flow Alarm is designed for high or low pressure service on water, oil, gas or air line applications when a signal is needed to indicate starting, stopping or insufficient flow. It consists



of a full-ported globe valve body to which is attached a patented magnetic switching arrangement. The switch-head and valve

(*Continued on Page 90*)

Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

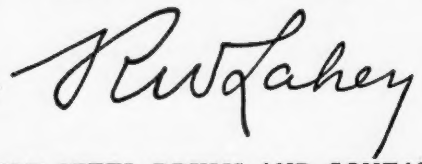
QC 153 QC 154 QC 155 QC 156

Name ....

Title .... **Company** ....

Address ....

Shipping and Container FORUM

By 

LININGS FOR STEEL DRUMS AND CONTAINERS—M. F. CRASS RETIRES—PRICE CEILING SET ON USED COTTON AND BURLAP BAGS; USE OF BURLAP BAGS RESTRICTED—ARMY SALVAGES PACKAGING MATERIALS — OPM IS WORKING ON VARIOUS TIN PROBLEMS

Editor's Comment:

The following article on drum linings by Mr. Mark W. Frishkorn, Vice-President of Ault & Wiborg Corporation is extremely timely. The shortages of zinc and tin have created difficult problems for shippers who have been using sheet galvanized, hot dip galvanized and hot tin dipped containers.

Lined steel containers have solved many of these problems. Manufacturers of linings can usually determine by laboratory tests if they can prepare an impervious and protective coating for the material in question.

LININGS for steel drums and containers are more important today than ever before, because the materials packaged in these containers are, in many instances, vital to defense.

Generally speaking, drum linings are designed to protect the contents of a container from contamination or discoloration from contact with steel, and not to protect the drum from the action of the contents so packed. This second objective, however, may be an auxiliary consideration.

Choosing appropriate linings for use with specific materials has required endless laboratory study. Extensive research, plus years of experience, has now established types of linings necessary for use with classes of materials. Even today, however, it may be advisable in some instances to run resistance tests to determine whether or not linings meet particular or unusual requirements.

There are five general types of container linings which we will consider. These vary both in their properties of resistance and in their reaction to certain classes of materials. They also vary in cost—the more resistant linings being more expensive than those more easily affected by deteriorants. These different linings will be designated as "Prime-coat System," "Lining A," "Lining B," "Lining C," and "Lining D." Formulas may not be disclosed, other than to say that they are all synthetic resin coatings, and obviously, the best lining is the two-coat "Prime-System."

Application to drums, kits, and other open containers is best accomplished by the spray brush method, but satisfactory application is being done to semi-closed containers like fire extinguishers, and blitzkrieg cans by the slushing or dipping method.

Here are brief descriptions of the uses and characteristics of these various linings.

"Prime-coat System"

This system has been designed for corrosive products ordinarily packed in either glass or wood. The two coats consist of a pigmented prime and a clear top coat. The result is a lining which offers satisfactory resistance against the greatest variety of products. According to extensive tests made in this field, it is about 400 per cent more resistant than any one coat drum lining finish.

The prime coat is sprayed over cleaned steel, after cutting with an appropriate thinner for ease of application. It is then baked for 20 to 25 minutes at 400 degrees F. A quick flash of high heat is to be avoided. The clear top coat is applied over the prime, and here again thinning is usually necessary. This is also baked for 20 to 25 minutes at 400 degrees. Additional clear coats may be applied, but if so, only the final coat is cured at the high schedule. Preliminary clear coats are baked at about 275 degrees F. for the same length of time.

NOTE: *All of the linings are sprayed on carefully cleaned steel. They are all supplied at approximate spray weight, but if thinning is desired, a Thinner is available for this purpose.*

Furthermore, all of the linings are baked on, at temperatures of about 400-425 degrees F. for a period of 20-25 minutes. Linings A & B yield protective films only when baked, but Linings C and D may be used for air-dry touch up work. However, the protection afforded is considerably less than that of a baked film.

Lining A

This is the most resistant of the one-coat systems. When properly applied and baked, it becomes hard, glass-like and insoluble in all known solvents. It is, therefore, especially useful as a lining for packaging such strong solvents as alcohol, chloroform, acetone, varnish remover, nitrocellulose lacquer, thinners, and so on. The tabulations which follow will indicate other materials which require this type of lining.

Lining "A" has been approved as a sanitary lining for steel beer barrels, and is being used extensively in this field. It is also very appropriate for turpentine drums, both plain and galvanized. Drums protected with this lining properly baked and aerated are absolutely free from oleoresinous paint and lacquer odor, and smell much sweeter than a plain steel drum.

If desirable or necessary to afford greater protection additional coats of Lining "A" may be applied as outlined under "Prime-coat System." With the use of special equipment for application and baking, this lining may be used in four to six-coat work on large tanks up to 20,000 gallons for dairy and beverage purposes.

Lining B

This lining is of the same general composition as Lining "A," but sells at a somewhat lower price and is less resistant to corrosive chemicals. Like Lining "A," it is insoluble in all known solvents. It is also free from paint and lacquer odor, when properly baked and aerated. More than one coat work with Lining "B" is not recommended.

This lining is being used with excellent results in containers for edible fats.

Lining C

Lining "C" is a high grade lining of the synthetic oleoresinous type, and it is the most widely used lining on the market for hydrogenated, edible oil products, such as Crisco, Primex, Snow-drift, Spry, and similar products. Empty drums recently lined with Lining "C" show a mild odor, which is not transmitted as an extraneous odor or flavor to materials packaged. For this reason, and because of its greater flexibility, a number of manufacturers of edible hydrogenated products prefer this lining to either Linings "A" or "B."

Lining "C" is also suitable for drums to contain lubricating oils, greases, and industrial oils.

Lining D

This lining is of the same general character as Lining "C," but is somewhat less resistant and is compounded to meet lower price requirements. It is also widely used for containers of hydrogenated edible oil products. Where the container is definitely a one-time shipper, this lining may be recommended. As in the case of Lin-

ing "C," Lining "D" shows a slight odor, which is not transmitted to the contents of the drum or kit.

Which Lining for Your Product?

The following charts have been prepared as a quick reference guide to the type of linings recommended and ordinarily used for products commonly packed in steel drums and kits. The numerals indicate the number of coats required, but it should be remembered that the "Prime-coat System" always employs both a primer and top coating.

ANIMAL and VEGETABLE OILS and FATTY ACIDS

	Prime Coat System	Lining A	Lining B	Lining C	Lining D
Acl (stearic acid chloride)	1	1	1	..	..
Adm No. 100 oil	1	1	1	..	..
Am Coco (fatty acid derivative)	1	1	..	..	..
Am Coco B (fatty acid derivative)	1	1	..	..	..
Am 1181 (fatty acid derivative)	1	1	1	..	..
Castor oil	1	1	1	1	1
Castor oil fatty acids	1	2	..	..	..
China wood oil	1	1	1	1	1
Essential oils	1	1	..	..	..
Fatty acids of drying oils	1	2	..	..	..
Fish oil	1	1	1	1	1
Fish oil fatty acids	1	2	..	..	..
K-1170 (fatty acid derivative)	1	1	1	1	..
Linseed oil	1	1	1	1	1
Linseed oil fatty acids	1	2	..	..	..
N Coco (fatty acid derivative)	1	1	1	..	..
Oleic acid	1	2	..	..	..
Perilla oil	1	1	1	1	1
Pine oil	1	1	1	1	1

FOOD PRODUCTS

	Prime Coat System	Lining A	Lining B	Lining C	Lining D
Amaizo (edible lactic acid)	1	..	..	..	..
Beer	1	2	..	..	..
Butter	1	2	..	..	..
Cane syrup	1	1	1	1	1
Caramel coloring	1	1	1	1	1
Chocolate drink syrup	1	1	..	..	..
Cola concentrates	1	2	..	..	..
Condensed milk	1	2	..	..	..
Diamalt	1	2	..	..	..
Evaporated milk	1	2	..	..	..
Hydrogenated edible oils	1	1	1	1	1
Karo syrup	1	1	1	1	1
Lard	1	1	1	1	1
Margarines	1	1	1	1	1
Soft drink concentrates	1	1	..	..	..
Sorghum molasses	1	1	..	..	..
Sugar syrup	1	1	1	1	1
Vitamin solution "B"	1	2	..	..	..

MISCELLANEOUS

	Prime Coat System	Lining A	Lining B	Lining C	Lining D
Arcolene soap (dry cleaning)	1	1	..	..	..
Basic casein emulsion	1	2	..	..	..
Formaldehyde (40% aqueous)	1	2	..	..	..
Green oil soap (40% aqueous)	1	2	..	..	..
Glycerine	1	1	..	..	..
Lav-O-Let (creosote)	1	..	..	..	..
Magnesium hydrate 30%	1	2	..	..	..
Paint products	1	2	..	..	..
Putty products	1	1	..	..	..
No. 600 Kop soap (dry cleaning)	1	2	..	..	..
Sohio soap	1	2	..	..	..
Urea formaldehyde resins	1	1	1	..	..
Varnish products	1	2	1	1	..
Witch hazel	1	2	..	..	..
Wood pulp lactic acid	1	2	..	..	..
Yellow pulp color	1	..	..	..	..
Zinc chloride (70%)	1	1	..	..	..

STRONG SOLVENTS
Coal Tar and Miscellaneous

	Prime Coat System	Lining A	Lining B	Lining C	Lining D
Acetone	1	1	1	..	..
Amyl acetate	1	1	1	..	..
Amyl alcohol	1	1	1	..	..
Ansol	1	1	1	1	..
Benzol	1	1	1	..	..
Butyl acetate	1	1	1	..	..
Butyl alcohol	1	1	1	1	..
Butyl lactate	1	1	..	..	..
Denatured alcohol	1	1	1	1	..
Dibutyl phthalate	1	1	1	..	..
Ether (sulfuric)	1	1	..	..	..
Ethyl acetate	1	1	..	..	..
Ethyl alcohol	1	1	1	1	..
Lacquer thinners	1	1	..	..	..
Lacquer (nitro)	1	2	..	..	..
Propylene dichloride	1	1	1	..	..
Toluol	1	1	1	1	..
Tricresyl phosphate	1	1	1	1	..
Turpentine	1	2	..	..	..
Xylol	1	1	1	1	..

PRODUCTS OF OIL REFINERS

	Prime Coat System	Lining A	Lining B	Lining C	Lining D
Base oil "A"	1	1	1	1	..
Gasoline	1	1	1	..	..
Grease (lubricating)	1	1	1	1	1
Hydrogenated naphtha	1	1	1	1	..
Hydrocarbon solvents	1	1	1	1	..
Industrial oils	1	1	1	1	1
Kerosene	1	1	1	..	..
Lubricating compounds	1	1	1	1	1
Lubricating oils	1	1	1	1	1
Mineral spirits	1	1	1	1	..
Nujol	1	1	1	1	..
Petroleum ether	1	1	1	..	..
Petroleum jelly	1	1	1	1	..
Petroleum solvents	1	1	1	1	..
Transformer oils	1	1	1	1	..

M. F. Crass—Du Pont Packaging Authority Retires

M. F. Crass, packaging specialist for E. I. du Pont de Nemours and Company, Inc., and a well-known authority on the packaging and shipping of chemicals and allied products, retired from active service on December 31, 1941, having reached the retirement age of 65 prescribed by the rules of his company. His retirement brought to a close a period of continuous and unbroken service with the du Pont Company and its former subsidiary the Grasselli Chemical Company, dating back to 1892.

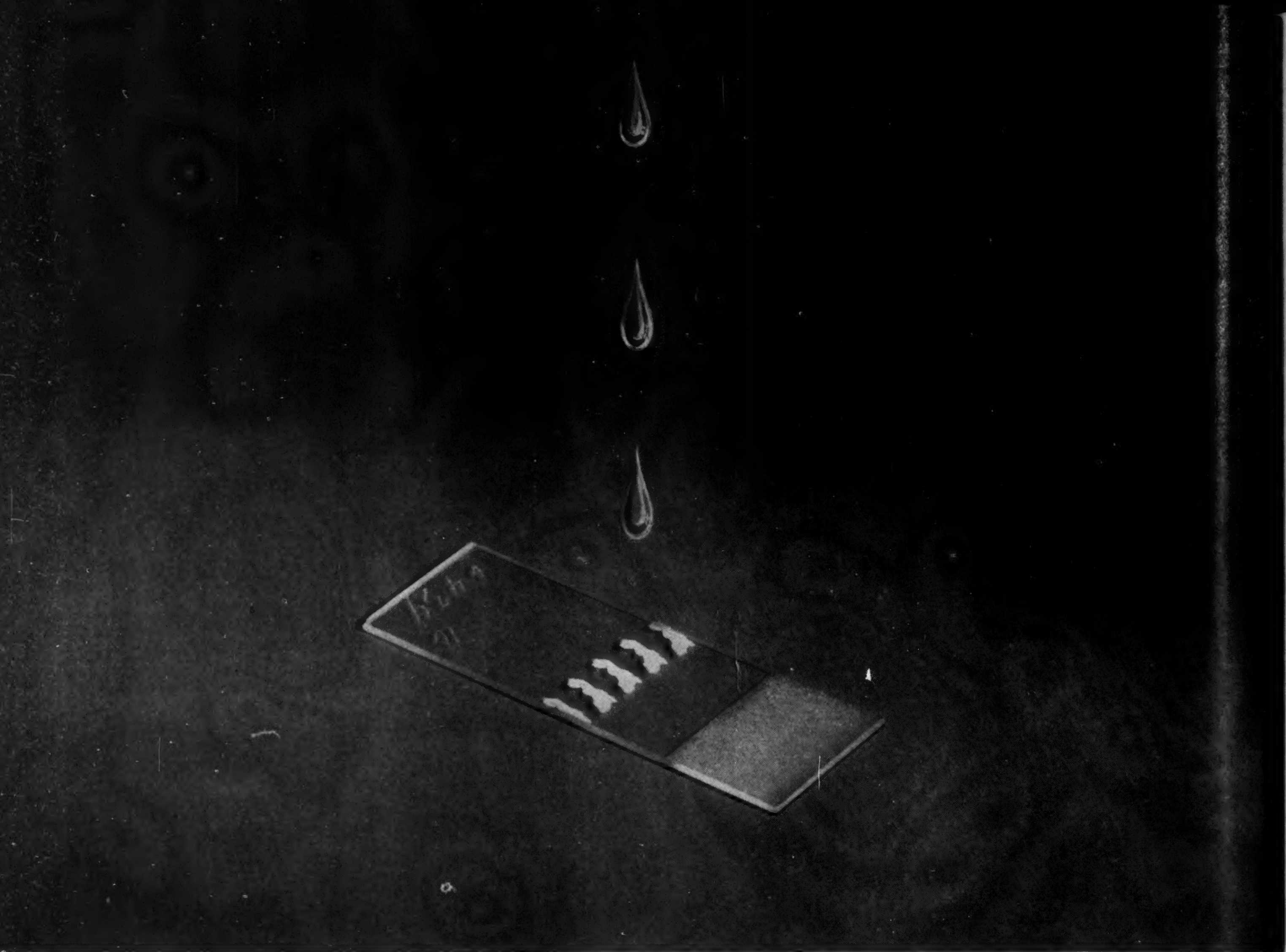
Mr. Crass first became associated with the chemical industry at the Cleveland, Ohio, plant of the Grasselli Chemical Company at the age of 16 as a time keeper, becoming in succession shipping clerk, chief clerk, plant superintendent, and assistant division superintendent. His interest in packaging became manifest during his tenure as shipping clerk, and shortly thereafter he assumed charge of all packaging matters for Grasselli, in addition to his regular production work.

M. F. CRASS

Following the incorporation of Grasselli into the du Pont Company in 1928, Mr. Crass was transferred to Wilmington, Delaware, and being relieved of his production duties devoted his entire time to the container and packaging problems of du Pont. He has long been active in the Technical Committees of the Manufacturing Chemists' Association, having been a charter member of 7 of these committees and holding the distinction of having served as chairman of 5 of them.

His retirement will bring his active participation in the affairs of these committees to a close. At the present time he is chairman of the Insecticide and Fungicide and Poisonous Articles and Miscellaneous Packages Committees. Mr. Crass has been personally responsible for the development of many of the Interstate Commerce Commission specification containers now in universal use for the shipment of dangerous articles.

(*Continued on Page 89*)



Where a *ONE-OUNCE* order is **BIG BUSINESS**

To stain a piece of diseased tissue for examination a pathologist may need only six drops of a National Biological Stain. So little of these highly sensitive dyes are used that a one-ounce bottle may last a busy pathological laboratory for years!

Yet we gladly perform the exacting laboratory work necessary to the preparation of these National Biological Stains and Indicators as our contribution to the beneficent science of human and animal medicine.

Biological Stains are but one of many important but specialized phases of National Technical Service. While expanding and improving the applicability of National Dyestuffs, National Research has also developed the most widely used line of synthetic detergents, an effective anti-skinning agent for paints, improved essential organic-chemicals for synthetic coatings, and many other equally useful products.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET **NEW YORK, N. Y.**

BOSTON	150 Causeway St.	SAN FRANCISCO	517 Howard St.	NEW ORLEANS	Masonic Temple Bldg.
PROVIDENCE	15 Westminster St.	CHARLOTTE	201-203 W. First St.	CHATTANOOGA	James Bldg.
CHICAGO	357 W. Erie St.	GREENSBORO	Jefferson Standard Bldg.	PORTLAND, ORE.	730 West Burnside
PHILADELPHIA	200-204 S. Front St.	ATLANTA	140 Peachtree St.	TORONTO	137-145 Wellington St., W.

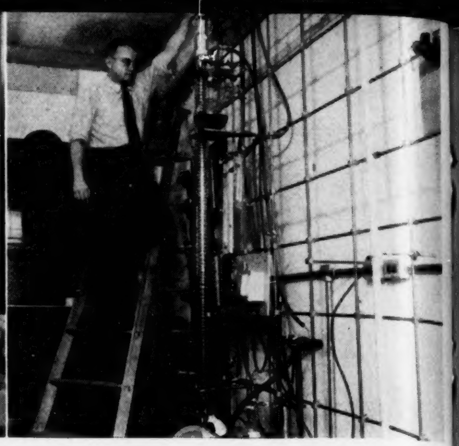
BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

NEW CHEMICALS FOR INDUSTRY

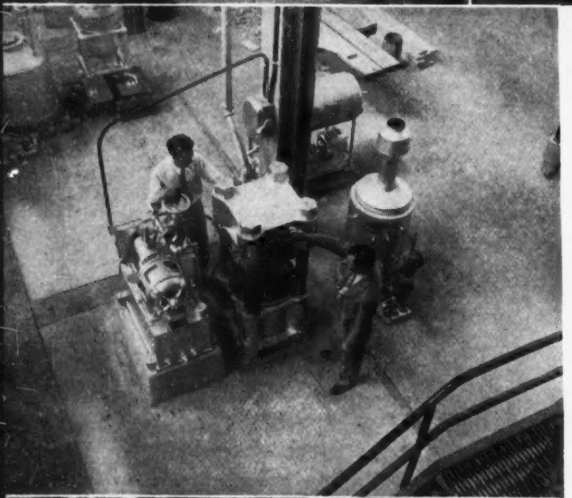
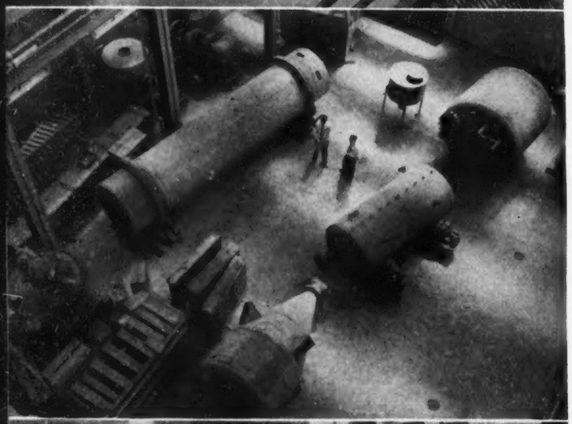
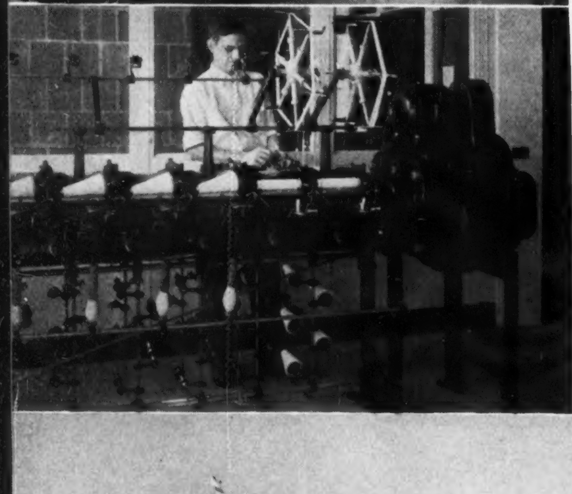
Blackout signs coated with fluorescent chemicals light up in almost complete darkness when activated by ultra-violet rays. They are part of a general survey of blackout needs being made by S. G. Hibben, director of applied lighting for Westinghouse. Hydrants, sidewalks, curbs, bomb shelters, cars, etc. can be so marked.

Digest of Chemical Developments in Converting and Processing Fields





Left corner, Dr. Knight examining sweet potatoes, a major product being studied at Southern Regional Research Laboratory. Below that, Dr. R. V. Williamson and T. F. Clark operating press for making lignin plastics, pilot plant, Northern laboratory. Above center, collection of molds for fermentation division, Northern laboratory. Above right, distilling a synthetic rubber intermediate from an agricultural waste material, Northern laboratory, Peoria, Ill.

Agricultural Research

Four regional laboratories are now conducting research on new scientific, chemical and technical uses for farm products. New and wider industrial outlets are being sought. With the war now accentuating the need of developing sources of supply for materials no longer imported, this article is especially timely and complete.

By Dr. Henry G. Knight

Chief, Bureau of Agricultural Chemistry and Engineering

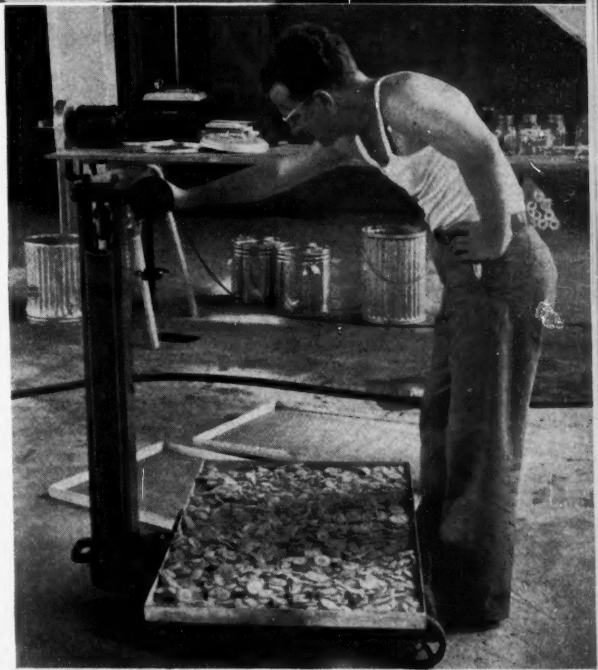
THE four regional research laboratories of the U. S. Department of Agriculture, which were authorized by Congress in 1938 to search for new and wider industrial outlets for farm products, have passed from plans on the drawing board to structures of brick and steel. During the past months personnel and equipment have been accumulated, and what were empty rooms a short time ago are now active laboratories working on a variety of problems appropriate to the particular region or dictated by defense needs. The main laboratory buildings were finished, partially equipped, and occupied in the latter part of 1940 and early part of 1941. A small amount of miscellaneous construction work remains to be done and some special equipment, including some of the large-scale, pilot-plant equipment is still to be obtained and installed, but, in the main, the research in these large laboratories is now well under way.

As of Nov. 1, 1941, each of the laboratories had a staff of permanent employees of more than 150 persons, or a total of more than 650 for the four laboratories. During the fiscal year 1942 the Bureau of Agricultural Chemistry and Engineering, which administers these laboratories, plans to bring the laboratory personnel up to around 850 for the four locations. The directors of the laboratories were named in 1938 and now the following list of heads of most of the principal divisions is available:

Northern Laboratory at Peoria, Ill. Orville E. May, director; H. E. Roethe, technical assistant. Division chiefs—S. T. Schicktanz, Agricultural Motor Fuels; E. C. Lathrop, Agricultural Residues; R. T. Milner, Analytical and Physical

Below right, power plant, Southern Regional Research Laboratory, New Orleans. Below left, exterior view, Western Regional Research Laboratory, Albany, Calif. Above that, winding cotton yarn for cotton research work, Southern laboratory. Above that, engineers planning details of erection of equipment in motor fuel pilot plant, Northern laboratory. Note on floor yeast culture tanks, rotary drier, grain bin, prefermenter, horizontal cooker, Henze cooker, etc.


Above, Sen. Wall Doxey and Dr. Knight examining chemical cotton made from cut cotton lint, Southern laboratory project (for defense program). Right corner, Dr. C. B. Jones working on suitable methods for obtaining feather solutions or dispersions for industrial uses, Western laboratory. Below that, weighting sliced carrots ready for dehydration. Carrots have been blanched by exposure to steam to stabilize color and flavor; Western laboratory, Albany, Cal.



Laboratories in Operation

Chemical; J. H. Shollenberger, Commodity Development; C. T. Langford, Engineering and Development; R. D. Coghill, Fermentation; R. H. Manley, Oil and Protein; and G. E. Hilbert, Starch and Dextrose.

Southern Laboratory at New Orleans, La. Daniel F. J. Lynch, director; H. P. Newton, technical assistant. Division chiefs—E. L. Skau, Analytical, Physical Chemical and Physical; W. M. Scott, Cotton Chemical Finishing; R. J. Cheatham, Cotton Processing; Kyle Ward, Jr., Cotton Fiber Research; E. A. Gastrock, Engineering and Development; K. S. Markley, Oil, Fat and Protein; and Paul R. Dawson, Sweetpotato Products and Byproducts.

Eastern Laboratory at Wyndmoor, near Philadelphia, Pa. Percy A. Wells, director;. R. E. Lothrop, technical assistant. Division chiefs—M. J. Copley, Analytical and Physical Chemical; J. J. Willaman. Biochemical; L. T. Smith, Carbohydrate; R. K. Eskew, Chemical Engineering and Development; R. W. Frey, Hides, Tanning Material and Leather; J. T. Scanlan, Oils and Fats; and R. W. Jackson, Protein.

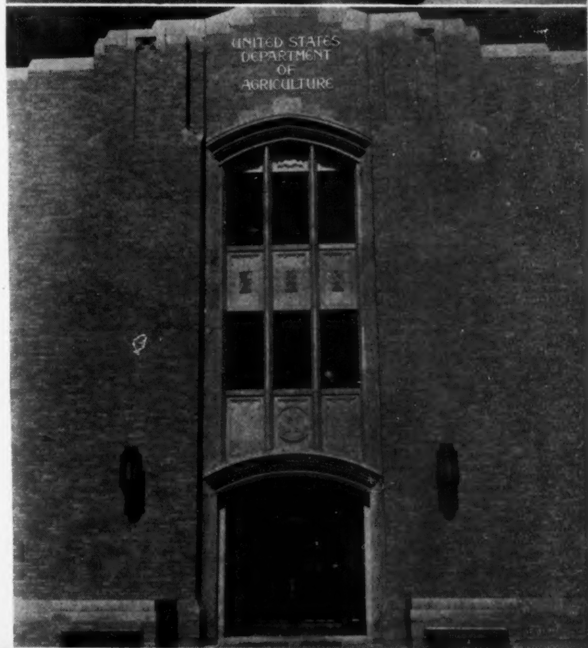
Western Laboratory at Albany, near San Francisco, Calif. Theodore L. Swenson, director; R. H. Nagel, technical assistant. Division chiefs—H. D. Lightbody, Biochemical; L. B. Howard, Commodity Byproducts; H. C. Diehl, Commodity Processing; W. B. VanArsdel, Engineering and Development; C. H. Kunsman, Physico-Chemical and Analytical; and M. J. Blish, Protein.

The laboratories have had the benefit of the total annual appropriation of $4,000,000 provided for in the enabling act only once, and that was in 1939, the first year of their existence. Total appropriations since then have been—for the fiscal year 1940, $3,200,000; for the fiscal year 1941, $3,000,000; and for the fiscal year 1942, $3,500,000.

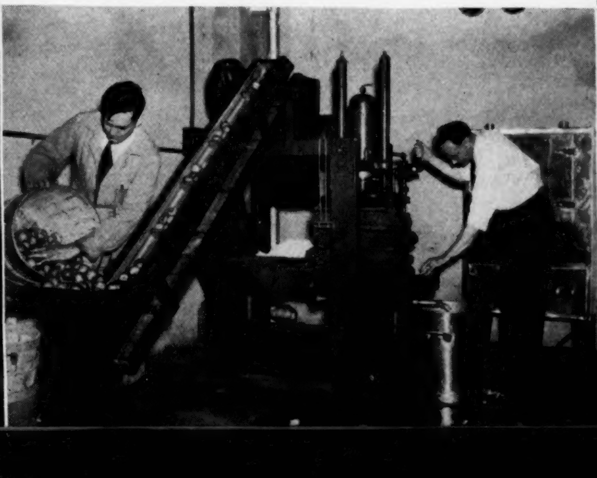
Type of Research Clear

When Congress provided for the establishment of these laboratories it made clear the type of research it had in mind and stated it in the Act as follows: "The Secretary of Agriculture is hereby authorized and directed to establish, equip, and maintain four regional research laboratories, one in each major farm producing area, and, at such laboratories, to conduct researches into and to develop new scientific, chemical, and technical uses and new and extended markets and outlets for farm commodities and products and byproducts

(*Continued on Page 90*)



Below left, cotton impregnated plastic helmets, which may become milady's hatwear for the duration as protection against flying debris, defense project research activity, Southern laboratory. Below center, apple processing room showing pressing of juice for pilot plant canning experiments, Biochemical Division, Eastern laboratory. Right corner, library with reading table in foreground, Eastern laboratory. Above that, entrance, Eastern Research Laboratory.



New Products and Processes

By James M. Crowe, *Assistant Editor*

POLY-PALE resin, a new resin derived from gum or wood rosin, pale in color, free of metals, and said to have a lower acid number and appreciably higher melting point and higher viscosity than any natural rosin, has been announced by the Naval Stores Department of Hercules Powder Company. The new resin was displayed at the Paint Industries Show at Chicago, October 27-29.

Laboratory and field tests are said to indicate that the new resin will be suitable for the preparation of gloss oils, hardened rosin varnishes, ester gum, rosin-modified phenolic resins, rosin-modified maleate resins, metallic resinates, spirit varnishes and other protective coatings.

Poly-pale resin is produced by the polymerization of the unsaturated resin acids in rosin. Approximately 40% of the resin consists of such polymers, the remaining portion being the normal constituents of rosin.

The melting point range of the new resin, 98 to 103° C., is 15 to 20° higher than the melting point range for gum and wood rosins from which it is made. The melting point of ester gum and other resins made from Poly-pale resin is similarly higher. Viscosity is correspondingly higher.

Ester gum, modified phenolic and maleic anhydride resins and metallic resinates made from Poly-pale resin have correspondingly higher melting points and viscosities than similar resins obtained from gum or wood rosin.

The Poly-pale resin reacts readily with all of the common metals used in making metal resinate driers. Higher percentages of most of the metals used will combine before blocking occurs, the company says. Esterification with glycerin requires less glycerin to produce esters of equal or higher melting point and normal acid number. In general, less maleic anhydride and less phenolaldehyde are required for the production of resins.

Poly-pale resin is soluble in most organic solvents, including hydrocarbons, alcohols, ethers, ketones, esters and chlorinated hydrocarbons. Solutions in all of these solvents are considerably higher in viscosity than are similar solutions of ordinary rosin at equal concentrations.

Subjected to many crystallization tests, dissolved in either solvents or drying oils, the new resin has not shown crystallization. This quality will make the resin useful in the manufacture of spirit varnishes, core oils, and printing inks where crystallization has been a serious problem. Solvent retention of the Poly-pale resin is not appreciably changed, but films obtained from its solutions are harder.

Physical properties of Poly-pale resin are as follows:

Melting Point (Drop)	98-103° C. (207-217° F)
Melting Point (Ring & Ball)	92-94° C. (198-210° F)
Acid Number	152-156
Saponification Number	157-160
Color (U. S. Standard)	WG-X
Refractive Index at 20° C.	1.5440

Carbon Black Process

An improvement in carbon black production that compensates for variations of temperature in burner houses has been announced by Continental Carbon Company which, according to recent tests, maintains a greater uniformity of carbon black and hence makes possible a rubber of higher quality.

Weather has been practically the only factor influencing uniformity that has not been controlled with scientific precision throughout the carbon black industry. An even, controlled flow of air and a constantly maintained temperature are needed for best results in the universally used channel process of production. Yet the balance of draft and temperature within the burner houses has been upset in even the most modern plants by variations of atmospheric temperature, changes in wind velocity or direction, and rain or snowstorms.

Known as Isothermal Control (Patent applied for), this new device was invented by L. N. Conner, gas engineer of Continental, in collaboration with engineering associates at the Continental Plant. In contrast to the old manual method of setting the draft openings occasionally in burner houses to obtain the desired amount of combustion, the new method compensates for any temperature change by automatically increasing or decreasing the amount of gas flow to the burners.

To test the effectiveness of this new system, one unit in the Continental Plant was operated for 30 days with the Control and 30 days without it. Frequent samples of the product were taken each day and tested with D.P.G. adsorption test which records variation in quality. The results were as follows:

	With Control	Without Control
Average D. P. G. Absorption	48.54	48.35
Maximum Plus Deviation	2.83	4.85
Maximum Minus Deviation	3.79	7.25
Average Deviation	1.04	2.23

Can Coatings

Important savings in tin consumption through development of methods of treating rolled steel strip for cans were foreseen as the result of a research program disclosed recently by Dr. Russell L. Jenkins, research director of Monsanto Chemical Company's Phosphate Division.

"In recent years new organic coatings have been used increasingly to coat the insides of cans," said Dr. Jenkins in explaining the background for the problem, "and these have broadened the list of products, particularly foods and beverages, available in this type container.

"Despite development of these new coatings it still has been necessary to tin plate the base steel or in the case of non-food products to plate it with terne, a mixture of tin and lead, in order to prevent rusting between the time the steel is made and its fabricating into cans.

"In protecting other types of steel from rust and corrosion, methods utilizing phosphoric acid and phosphates are now in wide use. These treatments are applied to steel that is later painted or otherwise coated.

"The research program we are initiating looks to the application of a phosphoric acid or phosphate treatment to rolled steel strip for use in cans. The work has been undertaken in order to develop a process which would make the use of tin unnecessary."

Since the can industry is one of the largest users of tin imported into this country, the development of such a process would tend to ease a raw materials problem and would be particularly important at this time.

Imitation Lemon Oil

Present world conditions have cut practically all sources of Oil Lemon Expressed American U. S. P. except that which is supplied by this country.

As a result there has been a steadily increasing demand for a satisfactory imitation lemon oil. Magnus, Mabee & Reynard, Inc., has announced that its research laboratories have succeeded in producing a lemon oil replacement of scientific manufacture that has proved successful in actual usage. The product is called Imitation Lemon Oil Expressed Type M M & R.

Testing samples, methods of use for most satisfactory results are available.

Mold Lubricant

Sintered bearings made with metallic powders can now be very readily released from their molds by the use of a new lubricant. This lubricant, known as Acrawax C is a synthetic wax made entirely from domestic raw materials and is, therefore, readily available. It is a hard,

brown wax having a melting point of 134° C.

The method of procedure for use as a mold lubricant is to blend 15% of Acrawax C and 85% of Stearic Acid, by melting together. Then 2-4% of this wax mixture, based on the weight of the metallic powder, is added to the metallic powder and the whole heated above the melting point of the wax mixture and tumbled in the usual way. The metallic powder after pressure forming, will release very readily from the mold.

Degreaser

A new mineral grease and dirt digestive solvent has been announced by A. F. Curran Corporation. The new product is called Gunk X-11 and is available in the form of a concentrate which may be diluted before use to charge large open cleaning tanks or vats.

The cleaning method is carried out by cold immersion of greasy or dirty parts. The solvent, it is said, not only takes the cling out of hard mineral dirt and grease accretion, but emulsifies them as well, so that they may be instantly and completely rinsed away by sluicing with a water hose.

The removed oil and dirt disappears in the form of a milky oil-in-water emulsion which does not clog sewer drains, or present a fire hazard. The new process, it is stated, makes possible grease cleaning operations on a large scale with little investment in equipment. Only simple rectangular tanks of suitable dimensions are necessary.

Acoustical Material

A new acoustical material which possesses an unusually high degree of sound-absorbing efficiency has been perfected by the Building Materials Division of the Armstrong Cork Company.

Made of a special-density fibrous composition, this material is called "Cushiontone." Four hundred and eighty-four deep perforations per square foot give Cushiontone high sound-absorption values at all standard frequencies, while its noise-reduction coefficient is said to reach as high as 75%.

Three standard thicknesses are available, ½", ⅝", and ⅞". Standard unit sizes are 12"x12" and 12"x24". The material may be installed on any rigid level surface, while the ⅞" unit may be erected to furring strips by nailing.

Cushiontone not only provides a high degree of glare-free light-reflection, but acts as an insulating material, thereby adding to its economy value. Naturally moisture-resistant, this acoustical material is suitable for use in offices, and in other buildings where humidity conditions are not excessive.

Chinaware Decalcomanias

A new process for making chinaware decalcomanias, which substitutes photolithography for hand-lithography in preparing plates from which decalcomanias are printed, has been developed by E. I. du Pont de Nemours & Company.

Exact and yet more rapid reproduction of artists' designs are among advantages claimed for the process. American independence in chinaware decalcomanias is expected when volume production is attained.

Seventy per cent of the decalcomanias used by American chinaware manufacturers were imported at the war's start. An increasing scarcity of decalcomanias helped create unprecedented backlogs in chinaware orders.

In the new process, artists' designs are photographed through color filters and reproduced on sensitized metal plates, instead of being tediously stippled by skilled craftsmen on soft stone. The designs are then transferred by use of a special offset lithograph press.

Odorless Paint

A newly improved paint, designed for use in plants and offices where odors from conventional paints are offensive to workers, has been announced by American-Marietta Co. Not perfumed but actually de-odorized before being canned, it is said to make possible painting in winter or summer without discomfort. Windows may be kept closed while the paint is being applied. The product sets in three hours, and is completely dry in 12 to 15 hours.

Designated Valdura No-Odor paint, it may be used on plaster, wall board, wood, cement, brick or metal, and is available in flat, egg-shell and gloss finishes. Coverage is 700 square feet to the gallon, with hiding power that makes possible one-coat jobs in many applications. Of heavy consistency, ease of brushing speeds application 10 to 25 per cent above conventional wall paints. It may be applied with a spray gun when cut with one pint of the proper thinner to one gallon of paint. Flat and egg-shell finishes may be stippled.

The finishes are washable, and colors are designed not to fade or dull with repeated washings. High reflectivity reduces light requirements. Colors available are white, cream, ivory, buff, grey, blue and green.

Textile Process

Quaker Chemical Products Corp. has set up a division for its "hygienizing process" for the treatment of textiles. According to the company a fabric that has been "hygienized" is one which has been rendered actively antiseptic. It means that the fabric is bacteriostatic and fungostatic, thus retarding germ growth, and resisting perspiration odors. The process involves applying certain chemicals with regular finishing materials without any additional operation.

Metal Protector

The Sudbury Laboratory has put on the market a new product named Aqua-Clear which is said to prevent rust and provide a clear supply of water from any metal tanks or pipes and from lead, brass, or black, galvanized or cast iron water systems.

The product is a clear, tasteless, harmless liquid which is added in small quantities to the water as it is put into the system. In many cases, it is convenient to add Aqua-Clear manually. In others, a proportioning device may be used. The amount required to prevent rust is one ounce to each 100 gallons of water. Somewhat larger quantities are required for the removal of old loose rust.

Rust formation is prevented by the deposit of a thin, non-permanent film on metal surfaces. This film is so thin that it does not interfere with the flow of water, even in narrow pipes, and it cannot build up to form a scale. It can be maintained, however, by adding Aqua-Clear in the original proportions as water is put into the system. Aqua-Clear is valuable not only for providing clear water and protecting new tanks from rust, but also for stopping further deterioration of old tanks and thus postponing replacement.

Synthetic Para-Cymene

Production of synthetic para-cymene (structurally para-methyl isopropyl benzene) from liquid terpenes is announced by Hercules Powder Company. A new unit for the production of the material is nearing completion at the Brunswick, Georgia, naval stores plant of the company.

Typical physical constants of the para-cymene developed by the company are:

% Para-cymene	not less than 95%
Boiling range (5-95%)	177.7° to 179.4°C.
Density $\frac{15.6° C.}{15.6° C.}$	0.8618
Optical rotation, n_D^{20}	1.4888
Color	water white
Unpolymerized residue	trace
Bromine number	3 to 7

An important use of para-cymene has been as an intermediate in the manufacture of phenols, carvacrol, thymol, and the cyclic alcohol, menthol. The essential oil industry consumes substantial quantities of carvacrol in the manufacture of odorants used in soaps.

Since para-cymene was first separated from Roman oil of cumin in 1841, many uses for the hydrocarbon have been developed.

Some of the reported uses of derivatives of para-cymene which may now be developed because of supplies made available by the synthetic process are: sulfonated cymene as an emulsifier and textile assistant, nitrocymene and cymidine as dye intermediates, an amine as a knock inhibitor for aviation fuel, and cumic, paratoluic and terephthalic acids formed from para-cymene.

CHEMICAL SPECIALTIES

Savabrush, product of Schalk Chemical Co., Los Angeles, is marketed in 8-ounce packages with the catchy slogan, "Makes Old Paint Brushes New!" Contents dissolved in three quarts of lukewarm water will clean about six moderate-size brushes.

INDUSTRIAL · HOUSEHOLD · AGRICULTURAL

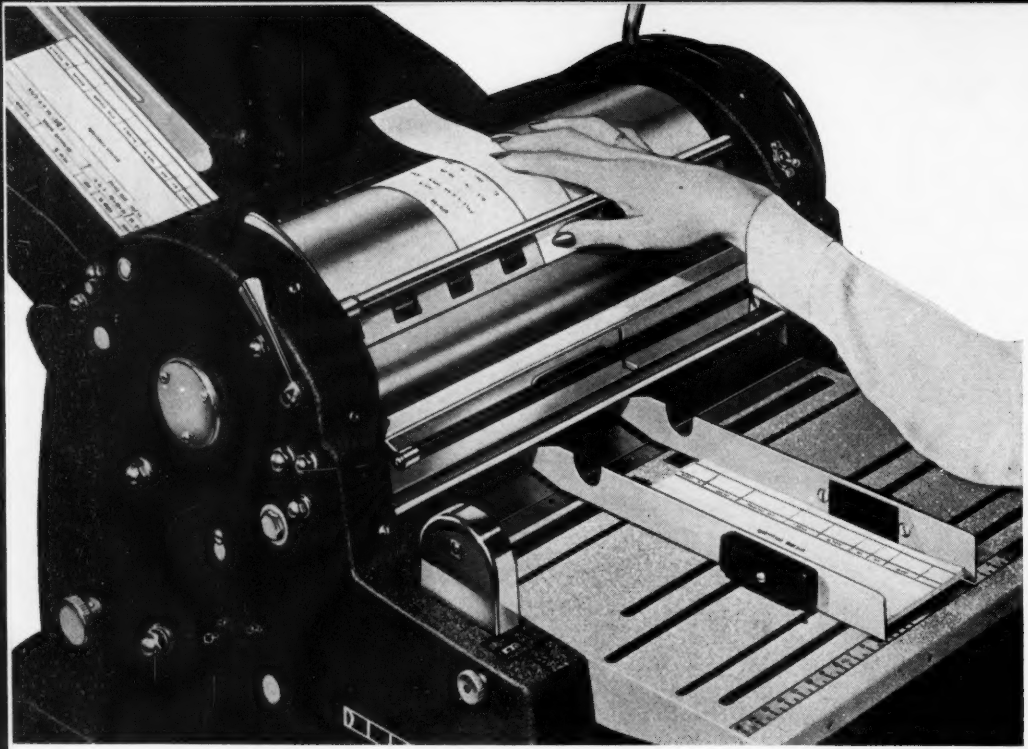


Photo: Ditto, Inc.

Machine widely used to run copies of parts and assembly orders in aircraft industry. This model has block-out strip which omits undesired data.

The Chemistry of Duplication

The author, who has a score of patents in this field issued or pending, correlates in this article processes and products in duplication industry as reflected or disclosed in patent literature.

By Johan Bjorksten,

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THE duplication industry has much in common with photographic manufacturing. In merchandising, both of these industries largely depend on the supplies, and view their machines principally as mechanical salesmen, which will secure a continuing volume of supply sales. Chemically, both deal with a multitude of variables, bordering almost on intangibles, in such diverse fields as surface chemistry, catalysis and colloids. And both of these chemical specialty industries have followed a policy of close secrecy in processes, waived only in the few instances when readily enforceable patent protection could be secured:

This article will discuss and correlate processes and products in the duplication industry, in so far as they are reflected or disclosed in the patent literature.

Though all printing is duplication in a broad sense, we shall here consider duplication in the more generally accepted meaning of the word, to signify the production of a relatively short run of copies on machines that can be handled by an office girl after a few hours instruction.

The commercially successful duplication processes may be divided into the following principal groups:

I. Hectograph Processes:

Write or type with ink containing a soluble dye.

Contact writing with *gelatinous mass* into which the dye diffuses.

Contact the mass with successive copy sheets, into which the dye is adsorbed from the mass.

This process is the most economical where less than 100 copies are required, and is characterized by extreme adaptability to different business systems and machines.

II. Solvent Process

Type or write on paper against special aniline dye carbon paper, so that a dye carrying mirror-reverse dye imprint is formed.

Place this mirror-reverse dye imprint on revolvable metal drum.

Contact mirror-reverse dye imprint with successive copy sheets, which *have been pre-moistened with an alcoholic solvent.* The solvent dissolves a part of the dye, thus causing transfer of some dye from the master imprint to each successive copy sheet.

This process is the most economical where about 100 to 400 copies are required; is characterized by extreme convenience in operation, corrections and alterations.

III. Stencil Processes:

Type or write on *stencil,* so that the stencil is perforated at points of writing.

Place perforated stencil over an ink supply, so that ink penetrates perforations in stencil.

Contact stencil with successive copy sheets, so that ink *penetrates stencil* in written parts, and thus prints on copy sheets.

This process is the most economical where more than 500 copies are needed; is adapted to straight run duplication rather than to business systems.

Chemistry of the Hectograph Process

The hectograph process is doubtless the chemically most complex of the duplication processes, as the hectograph gel is fundamentally a dye *solvent* (not *adsorbent*) gel. About 300 years ago, clay-water-honey compositions were used, to be later superseded by gelatin gels plasticized with glycerin, carbohydrates[11, 13, 70] and more recently also with glycol solvents,[91, 124] sulfonamides, sodium lactate[15] sorbitol[143] glyceryl and glycol phthalates[134] et cetera. The proteins have been predominatingly though not entirely of animalic origin.

The necessary resistance to atmospheric conditions is imparted to the gels by tanning agents,[58, 78] which by more or less gradual action increase the resistance of

the gel. The desirability of tanning a gel to the correct hardness,[5, 6] and arresting action at that point is a challenging problem, and one which is common to duplication and photographic industry. Attempts have been made to solve it by pH adjustments,[111] choice of tanning agents, addition of tanning retardants,[147] removal of excess tanning agents,[148] and photochemical tanning.[28] The most effective methods, however, have not yet been published and the pertinent patents may not issue for another year.

This problem of controlling tanning reactions may have considerable potentialities in medicine and gerontology.[141]

The amounts of acetaldehyde normally contained in human blood,[143] would amply suffice to tan completely the body proteins, in a matter of months. Such tanning is a cause of the rigidity, which occurs within a few hours after death.

In the living organism, this tanning is counteracted by (A)—the directional tanning under influence of repeated stretch and (B)—the continued state of flux in the protein molecules, which are continually split and re-synthetized. In this interplay of synthetic and splitting reactions, the protein molecules are broken down before tanning has gone very far, and re-synthetized in a non-tanned state.

The aging of living organisms I believe is due to the occasional formation, by tanning, of bridges between protein molecules, which cannot be broken by the cell enzymes. Such irreparable tanning may be caused by tanning agents foreign to the organism, or formed by unusual biological side reactions, or it may be due to the formation of a tanning bridge in some particular position in the protein molecule. In either event, the result is that cumulative tanning of body proteins, which we know as old age.

The copy strength, or intensity of the copies from the hectograph gel, is governed by numerous factors. Significant are solvent power of the plasticizer for the particular dye employed,[15] and the ratio of solid to liquid in the gel composition as well as the gel strength of the protein constituent. Anything that influences diffusion of dye likewise affects copy strength, and the hectograph industry is able to produce gels in which any given dye will diffuse at any desired rate of speed within very wide limits, without changing appreciably any other properties of the gel.

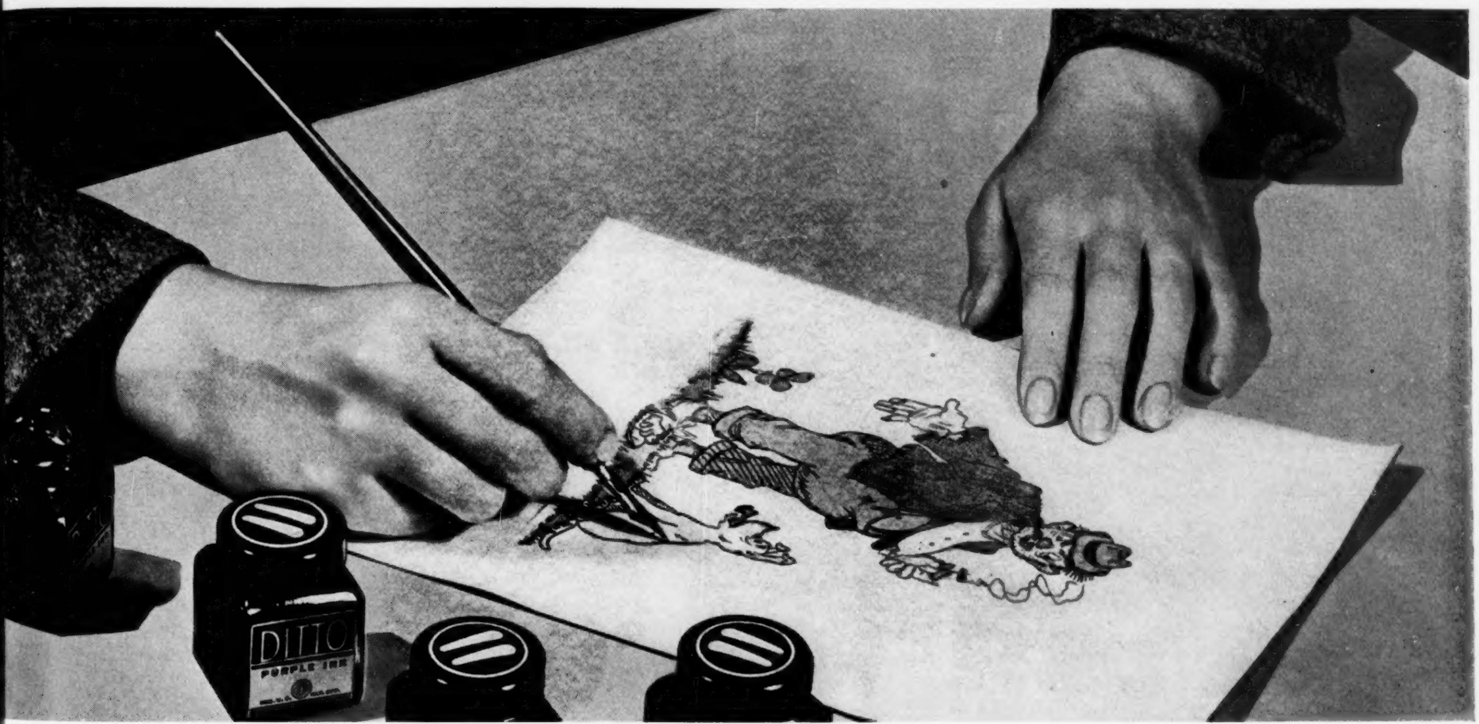
One of the expedients used for this purpose is to emulsify in the hectograph mass, before gellation, a material non-soluble in the plasticizer. The ultra microscopic globules of this emulsified material will impede diffusion of the dye by surface effects or by simply interposing non-dye solvent particles in the path of diffusion of the dye. Many of the various copy brightening agents patented[133, 134, 139, 142] depend on this principle; others on the increase of dye solvency,[15, 137] or on obscure surface effects.[24, 51, 90, 124]

The brightness of copies, and ease of handling also depend on the degree of tackiness of the composition, which must be carefully controlled. A certain amount of tack is necessary to secure adequate contact with the copy sheets—excessive tack leads to tearing of paper on the machine, damage to the surface of the hectograph mass, and other related complications. Generally speaking, tack is influenced by the type of protein employed, the acidity, the composition of plasticizer, certain ions, gums,[61] starch or the like,[4, 8] and modes of treating the mass while in a melted state. Tanning agents,[44] or soaps,[63] reduce tack, and thereby increase the number of copies obtainable. The mass may also contain antiseptics,[9] pigments,[34, 35] et cetera.

Several types of surface lubricants have been used to prevent sticking together of hectograph films or blankets in the process of handling in the plant,[17, 20, 27] when newly manufactured.

The surface cohesion of the mass is another very important characteristic. If this cohesion falls below a certain critical minimum under the influence of heat and humidity, then the adhesion to certain coated types of copy sheets may exceed the cohesion of the mass, so that particles of the mass loosen from the surface, which is thus destroyed. Cohesion is generally impaired by anything that increases the brittleness of the mass—excessive tanning is the most common influence in this class.

Another chemical problem in hectograph duplication is to secure a firm adhesion or "bond" to the cloth[3, 131] or high wet strength paper,[115, 127, 140, 10] which serves as the backing for the hectograph gel. The solutions found here may be of an interest far transcending that of duplication industry, since the task of securing



In one operation Ditto's gelatin machine will reproduce eight colors. These colored inks are laid down on a master copy with pen or water color brush.

adhesion between a protein and a base material is a rather general one. Means employed for this purpose include applying to the backing materials coatings of oils which on oxidation give off tanning decomposition products,[2] adsorbent montmorillonite type clays, tanning agents,[21, 114] carried by nitrocellulose type lacquers,[25] mutual solvents or plasticizers[31, 32, 36, 130] and various non-tanning ingredients.[37, 144] For an understanding of the bonding phenomenon it is important to keep in view that a bonding agent is a substance which has affinity both for the protein mass and for the adjacent backing. This usually is a lacquer coated cloth or paper of high wet strength, although other materials have been contemplated.[1, 12, 16, 22, 145]

Obviously all tanning agents which can be imbedded or adhered to a lacquer coating, will bind the protein material.[25] However, a great number of substances which are not tanning agents have the same properties. To have tanning properties, a substance must comprise at least *two* groups capable of reacting with different protein molecules so as to tie these together. For bonding purposes, it is sufficient that the substance have *one* group capable of becoming attached to the protein molecules, provided the rest of the molecule is adapted to becoming anchored to an adjacent coating of a different material. As is the case in all surface phenomena, the bonding is greatly affected by conditions of application and by any preceding treatment of the protein gels or of the bonding agent itself, as well as of a great multiplicity of other physical variables. While protein masses have been the most successful practically, numerous attempts have been made to utilize other types of gelling ingredients, such as agar-agar,[7] synthetic resins,[19] and cellulose derivatives.[42]

When copies have been taken from the hectograph mass, it is important that the dye disappear over a reasonable period of time so that the surface can be reused. This disappearance of dye is referred to as "clearing." Clearing occurs—A. By absorption of the dye to that part of the backing which will contact it when the hectograph blanket is rolled up and B. By diffusion of the dye into the interior of the mass and retention of the dye at that side of the backing which is covered by the mass.[64] Special ingredients may be used,[121] and the rate of clearing is profoundly affected by the composition and formulation of the hectograph mass. Any change in composition which reduces the speed of diffusion will increase copy strength, but reduce speed of clearing.

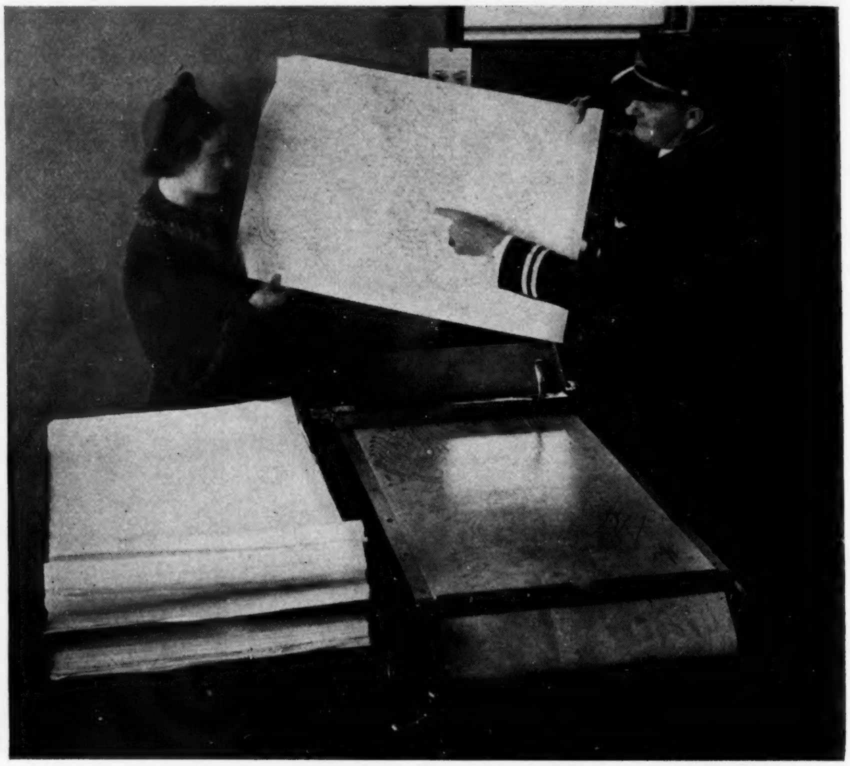


Photo: Ditto, Inc.

Air lines keep pilots supplied with weather reports and huge weather maps copied on flat bed duplicators such as this. Apparatus is easy to use.

The Solvent Process

In solvent process duplication, the chemical aspects are considerably less involved, although by no means so simple as they may appear. The solvent liquids contain a highly volatile ingredient in major proportions, and a substantially very much less volatile ingredient adapted to soften the master impression so as to increase the amount of dye transferred on each contact, and possibly also agents to prevent corrosion of metal parts contacted by the liquid, denaturants, agents to reduce flammability, and the like. The conventional duplication solvents are based on methanol which has the advantage of high volatility and a rather mild odor, but the great disadvantage of toxicity. More recently developed liquids,[14, 30, 146] are based on the non-toxic ethanol in combination with small amounts of other solvents which, by forming balanced constant boiling mixtures, impart to the composition sufficient volatility. Fluorinated hydrocarbons of the "Freon" type have been used to reduce flammability.[135]

In some cases, the liquid in the solvent process may be applied to the back side of the master.[45, 49, 54, 65]

In the dye carrying carbon papers used for making master impressions for the solvent process, it is naturally not necessary that the dyes employed be water soluble. On the contrary, water non-soluble dyes,[26, 46] generally have a superior fade resistance. Dyes soluble only in acid media have been used in conjunction with acidic liquids.[50] However, it is often desirable to use the same dye for hectograph and for solvent duplications, as these processes may be used to supplement each other in composite installations.

The dye carrying and depositing supplies such as carbons and hectograph ribbons are of crucial importance to the hectograph as well as to the solvent process. The number of copies and their brightness is limited by the amount of dye deposited and can be increased beyond a certain limit only by improvement in the carbons and ribbons. The intensity is governed by the character of the dye selected,[112, 128] the hardness and composition[94, 116, 117, 120] of the wax material vehicle,[132] mode of incorporation of the dye in the vehicle and the extent of subdivision or comminution of the dye, as well as on the presence or absence of unconventional ingredients[33, 62, 118] and pre-treatments of the base cloth material.[119] All of these factors have to be adapted to the particular application in view.

In recent years, the use of printed solvent process duplication masters has been vastly extended. For many applications printing inks are formulated in which the hectograph dye takes the place of the conventional pigment and the vehicle is either a solvent for this dye,[125] or sufficiently soluble in the other media with which it is contacted to release the dye particles in a state free from any nonsolvent film. Certain specialty printing processes have been employed.[48, 136]

Much progress has been made in recent years in the problem of fade resistance. The dyes which have the highest tinctorial strength are unfortunately rather susceptible to fading when exposed to direct

sun light. However, they can be protected from this action by incorporating light filtering substances in the duplication supplies, by including dye mordanting agents in the copy paper,[23, 43, 52, 56] or in the solvent. In this manner, the dye is transformed in the paper to an insoluble form which is substantially non-fading and which can be guaranteed to last more than one hundred years under ordinary office conditions. These improvements have greatly contributed to the wide spread and increasing adoption of the hectograph duplication process by insurance companies where permanency of records for the maximum human life time is prerequisite.

The character of the copies is largely influenced by the paper surface. Different types of finishes are required for use with solvent duplication and with hectograph. In the former case, special ingredients may be employed to precipitate the dye and prevent blurring or penetration in the paper. In the case of hectograph duplication, a highly porous paper will produce bright copies and a limited run, while lower porosity of the paper results in a longer run of less brilliant copies. Surface treatments of the papers with wetting agents,[129] and special solvents[18, 29, 53] have been recommended in certain instances.

The papers used for making the master impressions present a problem no less complex. In the case of the hectograph process, it is important that these papers present surfaces impermeable to oily ribbon inks.[59] With solvent process duplication,[44] it is necessary to control closely the adhesion properties between the paper and the wax vehicle that carries the dye in the paper surface, as otherwise the dye impressions from the carbon paper would be insufficient in volume or too broad. In master paper, the hygroscopicity characteristics are highly significant as this type of paper is widely used for printing with hectograph printing inks, and therefore must not curl or present other difficulties in handling on printing presses at high speed.

The Stencil Process

The stencil process is chemically far less complex. The stencil inks are mainly solutions of dark dyes in glycerin type solvents,[66] or in oil type media.[88] Since the tinctorial strength of the dye in each impression needs to suffice only for one copy, no need exists for the use of high intensity dyes and the formulation is correspondingly simplified. The principal requirements are that the ink penetrate the stencil without build up and that it does not spread or "feather" excessively. Naturally, the vehicle of the ink must not affect the coating of the stencil. This coating is either a cellulose ester;[67, 68, 97, 98, 99, 100, 107] ether;[101] or a paraffin type coating,[71, 72, 73, 77] although other materials such as proteins,[80, 81, 82, 83, 84, 85, 86, 123] shellac.[87, 89, 95, 96] certain resins,[75, 108, 109, 110, 113] waxes,[74, 76] bentonitic clays,[93] metallic films,[102] nylon type products,[126] agar-agar,[104] nitro starch,[122] or generally organic polymers of elastic character and amorphous structure,[105] may be employed. The stencil coating may occlude a lubricating oil,[103, 107] in a finely divided state.

The stencil processes and the hectograph processes can be advantageously combined by employing a special hectograph stencil ink on a stencil machine. Each copy produced in such a manner is a hectograph master, and can be used in turn to make a large number of hectograph copies.

A development of the stencil process is utilized with the Elliott Addressing machines, in which an oleaginous type ink is being impressed through a small stencil, of type adaptable to handling or indexing in business machines. The possibilities of combining this specialized type of stencil duplication with the hectograph process, are very intriguing.

Numerous specialty processes have been developed, but these have not gained commercial importance comparable to the three principal processes just outlined. Various ways of using sympathetic ink reactions for duplication purposes have been patented,[38, 57, 69] and are being resubmitted to manufacturers every year by hopeful inventors.

Methods of copying matter written or printed with ordinary record inks, have been considered since very early dates.[39, 40, 41] It appears that photographic methods combined with stencil[79, 92] or hectograph[47, 138] duplication will provide the most economical solutions of this problem.

The concept of duplication is as old as the commercial use of writing. The seals or signets used commonly in the Near East several thousand years before Christ, are nothing but duplication instruments, obviating the need for re-writing in the laborious style of those days. An inscription in negative obviously made by impression, has been found in Persia, which dates from the third century A. C.

The growing complexity of transactions and the concurrent development of mechanical bookkeeping and writing means, have necessitated a corresponding development of duplication.

Today, no need exists for re-typing in connection with the numerous reports and data required by the complexities of accounting, sales analysis and control, or reports to government agencies. All the information required for these various purposes is typed but once, and the requisite number of reports are made in a matter of seconds by running through machine blanks prepared to record or to omit any selected portions of the data, as needed by the various departments. The executive file report showing all the data relating to the transaction is made from the same typing as the label, which shows only the address of the customer. The time thus saved, and the elimination of errors on re-typing, is today saving literally millions of hours and dollars for defense and other industries.

Looking toward the future, one might

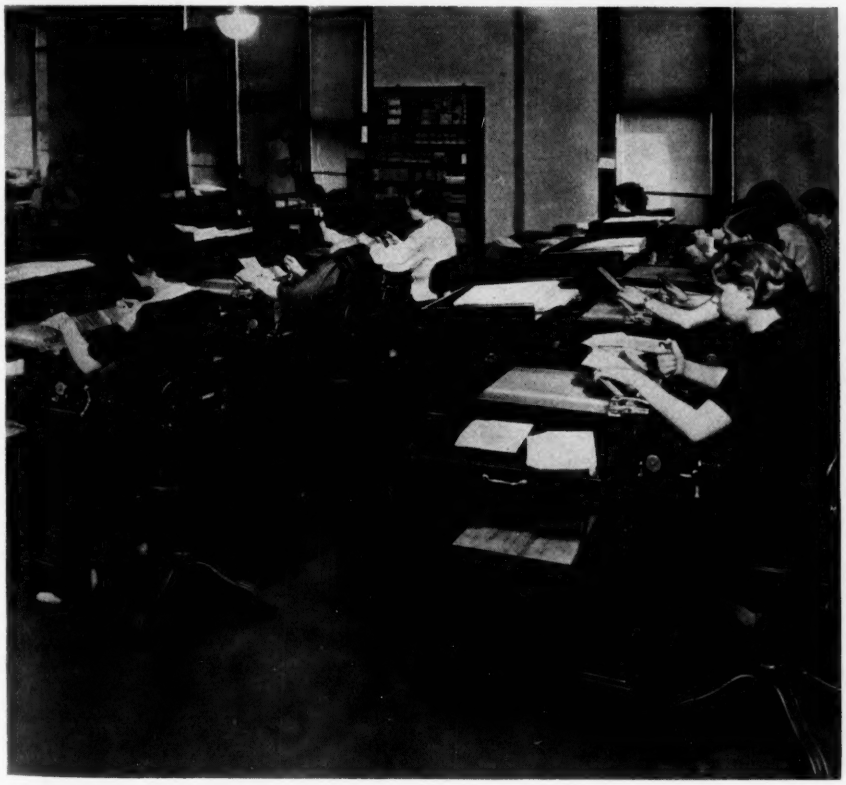


Photo: Ditto, Inc.

Many insurance companies make copies of permanent records on gelatin machines. Photo above shows a battery of gelatin machines in office use.

foresee still closer connection between duplication and all other types of business machinery, a greater differentiation between supplies adapted for specific requirements in copy strength and intensity, and the advent of new processes to keep pace with the ever changing complexities of our needs.

The author wishes to express his appreciation to T. W. Robinson, Jr., vice-president of Ditto, Inc., for the active encouragement of research in fields related to duplication and for several valuable suggestions.

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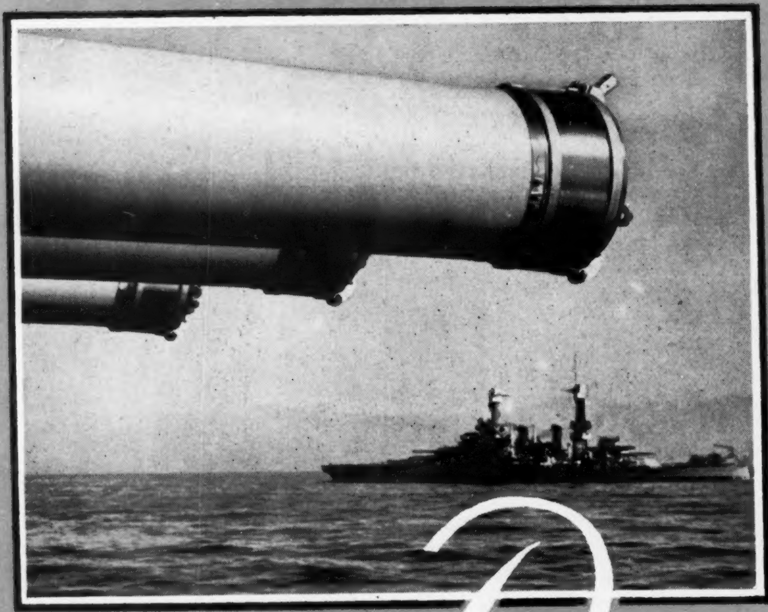
120 J. Bjorksten et al., U. S. P. 2,188,590 (1940), to Ditto, Inc.
121 J. Bjorksten, U. S. P. 2,191,514 (1940), to Ditto, Inc.
122 W. O. Snelling, U. S. P. 2,191,731 (1940), to Trojan Powder Co.
123 J. P. Bishop, U. S. P. 2,194,291 (1940), to Corn Products Refining Co.
124 W. Hoskins, Jr., U. S. P. 2,216,590 (1940), to Ditto, Incorporated.
125 H. A. Lubs et al., U. S. P. 2,200,069 (1940), to du Pont de Nemours & Co.
126 S. Horii, U. S. P. 2,208,980 (1940).
127 M. O. Schur, U. S. P. 2,215,136 (1940), to Brown Co.
128 G. G. Neidich, U. S. P. 2,217,349 (1940).
129 R. C. Bour, U. S. P. 2,240,031 (1941), to Ditto, Inc.
130 R. C. Bour, U. S. P. 2,240,032 (1941), to Ditto, Inc.
131 W. Hoskins, Jr. et al., 2,240,041 (1941), to Ditto, Inc.
132 J. Bjorksten et al., U. S. P. 2,243,078 (1941), to Ditto, Inc.
133 R. C. Bour, U. S. P. 2,247,347 (1941), to Ditto, Inc.
134 W. J. Champion, U. S. P. 2,247,349 (1941), to Ditto, Inc.
135 J. Bjorksten, U. S. P. 2,254,469 (1941), to Ditto, Inc.
136 A. L. Hess et al., U. S. P. 2,254,483 (1941), to Ditto, Inc.
137 W. J. Champion, U. S. P. 2,255,912 (1941), to Ditto, Inc.
138 W. J. Champion, U. S. P. 2,257,105 (1941), to Ditto, Inc.
139 W. Hoskins, Jr., U. S. P. 2,257,116 (1941), to Ditto, Inc.
140 A. K. Smith, U. S. P. 2,258,628 (1941), to the Inst. of Paper Chemistry.
141 J. Bjorksten, Chemical Industries, *48*, 751, (1941).
142 B. Weill, French 357,744 (1905).
143 J. Y. Johnson, British 282,894 (1928), to I. G. Farben.
144 R. C. Bour, U. S. P. 2,260,506 (1941), to Ditto, Inc.
145 W. Hoskins, Jr., U. S. P. 2,260,379 (1941), to Ditto, Inc.
146 J. Bjorksten, U. S. P. 2,262,488 (1941), to Ditto, Inc.
147 S. E. Sheppard et al., U. S. P. 2,165,421 (1939), to Eastman Kodak Co.
148 S. E. Sheppard et al., U. S. P. 2,227,982 (1941), to Eastman Kodak Co.

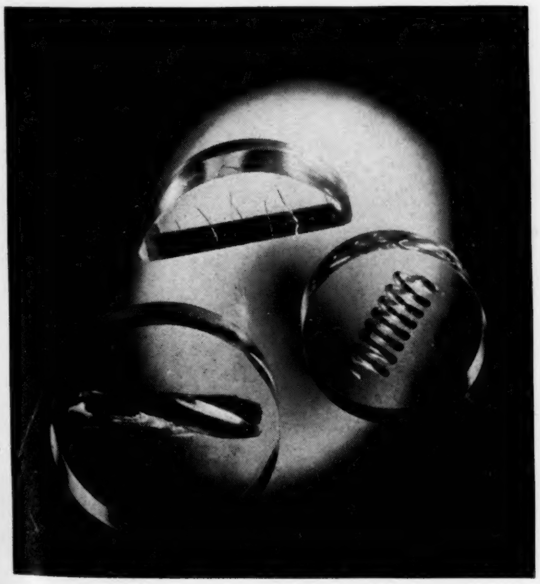


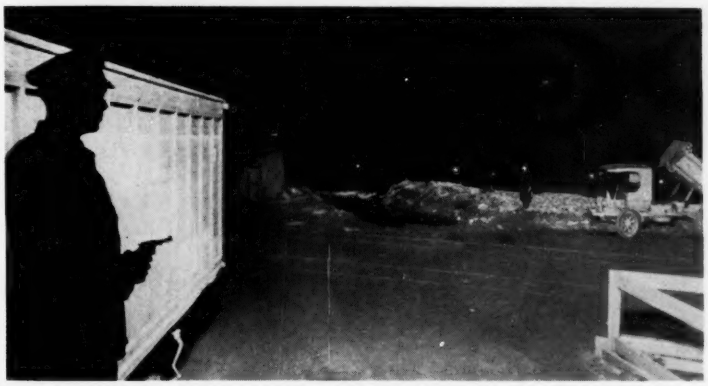
Here and There With The Chemical Industry

Salesmen's Association of the American Chemical Industry held its Christmas Party Dec. 18 at the Waldorf, N. Y. City, in celebration of the association's 20th anniversary. Photo above, taken at the party, shows one of the acts on the entertainment program. In charge of the party were: Phil Lo Bue, Michigan Chemical Co.; Charles Alexander, Seldner & Enequist; Robert J. Milano, Millmaster Chemical; Frank McHugh, New York Quinine & Chemical; Jack Remensnyder, Heyden Chemical; Frank Fanning, Malmstrom & Co.; and Edward Boehm, National Aniline.

Huge hydraulic press at Ford Motor Co. turns out plastic moldings for instrument panels at the rate of two complete sets a minute. Eight distinct operations are automatically performed by this injection molder, designed especially for the job.

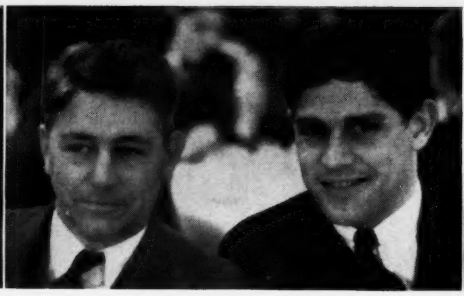
Adolph Beuhler Co., Chicago, has developed a technique of molding a block of transparent Crystallite around samples. Plastic is 4 per cent more transparent than glass and protects products from corrosion or scratching and permits permanent labeling.





Westinghouse lighting engineers have worked out a protective lighting scheme against sabotage which blinds would-be intruders to war-materials plants while guards remain inconspicuous in the shadows. Fresnel lens is used to throw flat, fan-shaped beam of light. Space between luminaire and buildings is virtually in darkness. Top photo shows what would-be saboteur sees of a plant so protected. Bottom photo shows what the guards see.

Robert J. Quinn and son



Walter Savelle and son, Kelvin

Dr. George H. Wright and son, Tommy

Fathers and Sons Attend Third Annual Luncheon

Fathers and sons proudly showed each other off December 30 at their third annual luncheon in the Chemists' Club, N. Y. City. W. S. Landis, American Cyanamid, president of the Club, welcomed the guests—about 75 strong. R. J. Quinn, Mathieson Alkali, acted as master of ceremonies and William J. Orchard, Wallace & Tiernan, spoke on the responsibilities of the boys and their parents toward their country. These pictures were taken by C.I. at the luncheon.

Ira Vandewater and son, John

William Orchard, who spoke at the luncheon

Egbert White and son, John

William F. Weed and his dad, William J. Weed

Karl M. Herstein and son, Bernard

Dr. Daniel D. Berolzheimer and son, Daniel Jr.

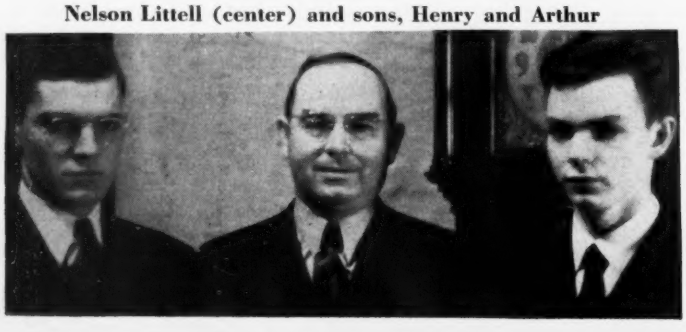
John P. Landis, son of Walter Landis, president of the Club

Robert Wishnick and sons, William and Jack

Dr. Robert J. Moore and son

Three generations of Dorlands, Jack, Wayne, "Doc" and Grant, Jr., son of Grant A. Dorland

Nelson Littell (center) and sons, Henry and Arthur



Edward J. Maguire and sons, Eugene and Edward

SHARPLES ALKYLAMINOETHANOLS

PROPERTIES	ETHYL MONOETHANOL-AMINE	ETHYL DIETHANOL-AMINE	DIETHYL AMINO-ETHANOL	n-BUTYL MONOETHANOL-AMINE	n-BUTYL DIETHANOL-AMINE	DI-n-BUTYL AMINO-ETHANOL
COLOR AND FORM	COLORLESS LIQUID	COLORLESS LIQUID	COLORLESS LIQUID	COLORLESS LIQUID	LIGHT STRAW LIQUID	COLORLESS LIQUID
PURITY	99-100%	99-100%	99.5-100%	97-99%	97-99%	98-99%
MOLECULAR WEIGHT	89.1	133.2	117.2	117.2	161.3	173.3
SPECIFIC GRAVITY @ 20°C	0.914	1.015	0.88-0.89	0.892	0.970	0.859
LBS. PER GALLON	7.61	8.46	7.36	7.44	8.09	7.16
DISTILLATION RANGE °C	164-169	247-252	158-163	197-202	271-276	226-232
MELTING POINT °C	−8.8	−50 (GLASSY SOLID)	<−70	−3.5	<−70	<−70
FLASH POINT °F	160	255	135	170	245	200
REFRACTIVE INDEX @ 20°C	1.4440	1.4663	1.4400	1.4437	1.4620	1.4444
COEFFICIENT OF EXPANSION X 10^{-3}	0.91	0.80	1.2	1.00	0.77	1.14
VISCOSITY AT 25°C., POISE	12.4	53	4.05	17.4	55	6.5
HEAT OF COMBUSTION, KG. CAL./MOL	603	1035	1081	1022	1348	1706
SOLUBILITY IN WATER	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SLIGHTLY SOLUBLE
SOLUBILITY IN ALCOHOL	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE
SOLUBILITY IN BENZINE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE
SOLUBILITY IN PARAFFIN HYDROCARBONS	SOLUBLE	SLIGHTLY SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE	SOLUBLE

The above alkylaminoethanols offer a wide range of selection where a delicate balance between miscibility in water and oil is of primary importance. Those compounds having a preponderance of ethanol groups in the molecule are more water soluble and less soluble in oil than the ones in which the alkyl radical predominates.

The fatty acid soaps of Sharples Alkylaminoethanols and other derivatives such as esters and acid amides are very low in odor and exhibit interesting properties as emulsifying, wetting and penetrating agents. They should be of interest to the textile industry while the amines themselves may be suitable as raw materials for new products in the pharmaceutical and dyestuffs industries. Diethylaminoethanol has been used for some time in the synthesis of certain esters having pharmacological properties, an example of which is the anesthetic, procaine.

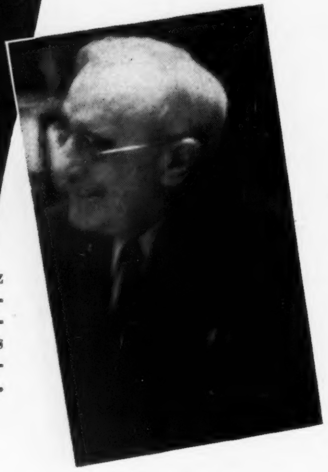
Because of the comparatively recent advent of most of these products, many new applications are yet to be found and Sharples will welcome the opportunity of cooperating with those who may wish to investigate their use.

SHARPLES CHEMICALS INC.

NEW YORK PHILADELPHIA CHICAGO

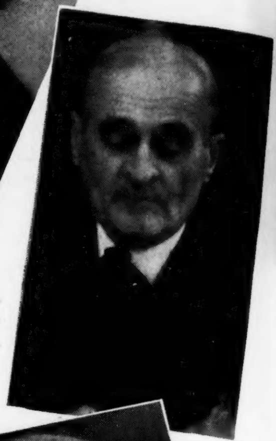
Synthetic Organic Chemical Manufacturers Association Holds Annual Meeting December 9

Annual meeting of the Synthetic Organic Chemical Manufacturers Association was held Dec. 9 at the Chemists' Club, N. Y. City. August Merz, chemical director of Calco Division, American Cyanamid, was re-elected president. Charles Mace, secretary, reported on the activities of the association during 1941 and discussed problems which arose from the national emergency. Pictures on this page were taken at the meeting which was attended by about 125 members and guests.



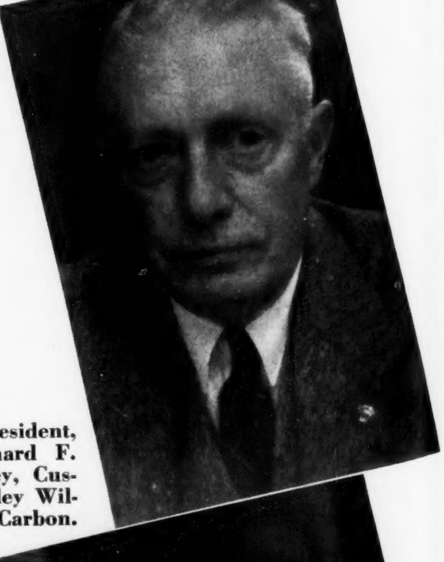
Above, Dr. August Merz of Calco, re-elected president of the association. Right, Thomas Gorman, Deputy Commissioner, U. S. Customs.

Above, R. P. Wilhelm, Monsanto.

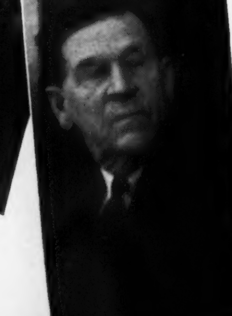


Above, E. H. Killheffer, du Pont, and right, Frederick G. Zinsser, Zinsser & Co.

Left to right, H. G. Potts, Customs Examiner; A. Simonette, Ass't. U. S. Appraiser of Customs; Sigmund Neustadt, Chief under Valuation Unit, U. S. Customs.



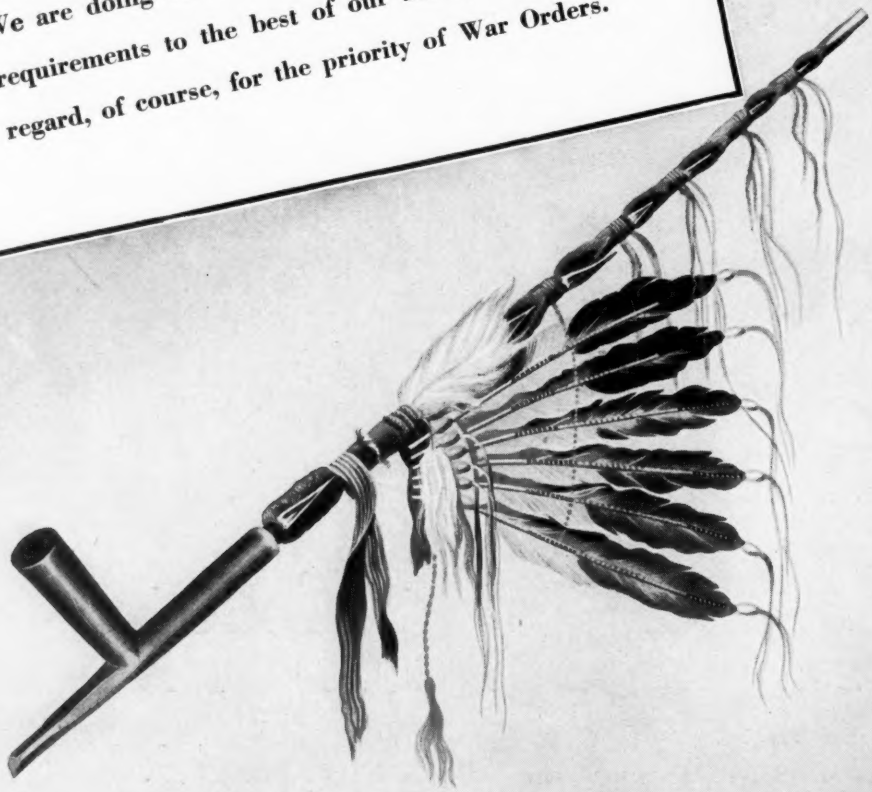
Right, C. P. Gulick, president, NOPCO, below, Richard F. Weeks, U. S. Attorney, Customs Court, and Stanley Williamson, Carbide and Carbon.



Left, C. A. Mace, secretary, and below, Strickland Gillilan, guest speaker.

War Orders come first . . .

We are doing our utmost to fill our customers' requirements to the best of our ability with due regard, of course, for the priority of War Orders.



THE PEACE THAT WAS MORE THAN A PIPE-DREAM

After William Penn made his famous treaty under the elm in 1683, he kept such faith with the Indians that his colony prospered from the start. Within three years there were 8,000 colonists living peacefully in Pennsylvania.

Integrity is fruitful in business, too. It is progressiveness in manufacture and persistence in research that gives Penn Salt its reputation for improved chemical products. And it is efficiency that makes its technical service so helpful to customers. The growth of its sales from small beginnings ninety-one years ago to its present nation-wide scope rests chiefly on the record it has earned for keeping faith in every business contact.

CHEMISTRY IS THE KEYSTONE OF INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY
1850 *Chemicals* 1941

WIDENER BUILDING, PHILADELPHIA

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • WYANDOTTE • TACOMA • PORTLAND

NEWS OF THE MONTH

GOVERNMENT

Minimum Wages Set In Chemical Industry

PREVAILING minimum wages in the chemical and related products industry were set last month by the Department of Labor at (1) 40 cents an hour or $16 per week of 40 hours, either on time or piece work basis, in Maryland, Virginia, North Carolina, South Carolina, Tennessee, Arkansas, Mississippi, Alabama, Georgia, Florida and the District of Columbia, and (2) 50 cents an hour or $20 per week of 40 hours, either on time or piece work basis, for the remaining states. This, in effect, is contained in a notice of opportunity issued Dec. 11 by the Division of Public Contracts to show cause why the Secretary of Labor should not determine the prevailing wages to be at those levels. Briefs for or against the determination were to be filed on or before Dec. 29, 1941.

The wage determination, made after consideration of the entire record, comes under Section 1(b) of the Public Contracts Act.

For the purposes of proceeding, the chemical and related products industry was defined as that industry which manufactures A. (1) heavy, industrial, and fine chemicals, including among others compressed and liquefied gases, and insecticides and fungicides, and (2) the by-products of the foregoing; and B. the manufacture of such commodities as bluing; bone black, carbon black, and lampblack; cleaning and polishing preparations (except paint and varnish remover, furniture and floor wax and polish, and soap); mucilage, paste, and other adhesives. Omitted from the scope of the definition of this industry are: fertilizer; drugs and medicines; ammunition; explosives; fireworks; paints, pigments, varnishes and lacquers; and soap, which have been accorded separate treatment by the Secretary of Labor.

Recommendations of the Public Contracts Board were arrived at following a hearing on April 11, 1940 attended by several members of industry, representatives of the Chemical Alliance and representatives of organized labor. In view of the findings of the board the following minimum wage scales were recommended:

(1) 40 cents an hour or $16.00 a week of 40 hours, arrived at either upon a time or piece-work basis, for the states of Maryland, Virginia, North Carolina, South Carolina, Tennessee, Arkansas, Kansas, Mississippi, Alabama, Georgia, Florida, and the District of Columbia.

(2) 45 cents an hour or $18.00 a week of 40 hours, arrived at either upon a time or piece-work basis, for the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Louisiana, Texas, New Mexico, and Arizona.

(3) 50 cents an hour or $20.00 a week of 40 hours, arrived at either upon a time or piece-work basis, for the states of New Jersey and Delaware.

(4) 60 cents an hour or $24.00 a week of 40 hours, arrived at either upon a time or piece-work basis, for the states of New York, Pennsylvania, Ohio, West Virginia, Indiana, Kentucky, Michigan, Illinois, Missouri, Oklahoma, Colorado, Montana, Wyoming, Utah, Nevada, Idaho, California, Washington and Oregon.

It was further recommended that the minimum wage determination for this industry authorize the employment of apprentices at wages below the established minimums, provided that their employment conforms to the standards of the Federal Committee on Apprenticeship.

Wage data was secured from surveys in reaching the recommendations and individual plant wage schedules and wage distribution tables by states were studied. A representative of industry made the request for provision of employment of apprentices, it was revealed.

Income Tax Is Here Again

To assist taxpayers in the preparation of their income tax returns the Treasury Department has issued a folder entitled "How to File Your Income Tax Return the Simple Way." It contains a facsimile of the simplified Form 1040A and illustrates six steps required to prepare the return. Form 1040A may be used by persons who are required to file returns but who have gross incomes of not more than $3,000 from salaries, wages, compensation for personal services, dividends, interest, rent, annuities, and royalties only.

Individuals, and corporations desiring the folder for distribution to employees, may secure copies from the nearest Collector of Internal Revenue.

Dyestuff Committee Set

An advisory committee on dyestuffs, composed of representatives of leading dyestuff producers, has just been appointed by The Textile Color Card Association. It is composed of the following members: B. R. Price, National Aniline Division, Allied Chemical & Dye Corp.; J. F. Warner, Calco Chemical Division, American Cyanamid Co.; Samuel I. Parker, Ciba Company, Inc.; W. F. Van Riper, E. I. du Pont de Nemours & Co., Daniel P. Knowland, Geigy Company, Inc.; J. R. Bonnar, General Dyestuff Corp. and James Walker, Sandoz Chemical Works, Inc.

Reed Now With Foote

E. L. Reed has been added to the staff of Foote Mineral Company as project engineer to do research and development work on milling and concentration problems.

Hormone Trust Broken

Four corporations and five officers of those corporations were charged this month with conspiring with German and other European interests to restrict the importation and manufacture of medicinal hormones in the U. S. and to control other world markets and fined $54,000, according to an announcement by the Department of Justice. Corporations, who pleaded nolo contendere in Federal Court, Newark, N. J., were: Schering Corp., Bloomfield; Ciba Pharmaceutical Products, Inc. Summit, N. J.; Roche-Organon, Inc., N. J.; and Rare Chemicals, Inc., Flemington, N. J.

The Department of Justice in its charges explained that the corporations and persons engaged in making hormones violated the anti-trust laws by the conspiracy to "prevent other persons from manufacturing or importing hormones into the U. S. with allocating among themselves various countries of the world as markets for the sale of hormones and with conspiring to establish and maintain arbitrary prices."

The department described in great detail various schemes to restrict markets here, in South America, Cuba and Canada.

Patent Office Moves

United States Patent Office, which had been expected to move to N. Y. City to relieve congestion in Washington, now will be transferred to Richmond, Va. as the result of an unexpected change in plans. Entire examining corps, interference divisions and the Board of Patent Appeals are affected. Search room, files and scientific library are to remain in Washington.

New York OPM Office Moves

Local New York City office of the Priorities Field Service of OPM now is located at 122 East 42d st.

OPM Sets Up Alkali Unit

Chemicals branch of the Materials Division, OPM, has set up an alkali unit in Washington with John E. Russell, formerly with Diamond Alkali, as head.

COMPANIES

Vick Takes Over Baker

Controlling interest in J. T. Baker Chemical Company, which operates its plant in Phillipsburg, N. J., has been sold to Vick Chemical, in a deal involving about two and a quarter million dollars.

Announcement of the sale of the majority of the common stock of the Baker Company was announced last month by Herbert H. Garis, of Easton, president of the Baker Co., in a letter to common stockholders.

At the same time it was announced that the Baker Co. will retain its identity and its name, and the personnel and the policy of the company will remain unchanged.

The Vick Chemical Co. is a widely known concern, manufacturers of Vick's Vapo-Rub, and other products bearing the name "Vick's."

Union Potash Absorbed

The International Minerals and Chemical Corporation, formerly International Agricultural Corporation, has acquired 149,222 common shares of Union Potash and Chemical, its subsidiary, at $6.50 a share, thereby gaining a majority interest in that company and clearing the way for a merger or consolidation of the two corporations.

Louis Ware, president of International Minerals and Chemical, said that the stock purchase, together with former holdings, gives the parent company 464,985 shares, or 82.26%, of Union Potash common stock. In addition the parent company owns 74,805 of the 78,421 preferred shares of Union Potash.

New Harshaw-Stauffer Firm

A joint enterprise of Harshaw Chemical Co., Cleveland, and Stauffer Chemical Co., San Francisco, has been set up in Lewiston, N. Y., under the name New York-Ohio Chemical Corp. Capitalized at $500,000, the company expects to begin operations early this year. Manganese chloride will be the first of the gradually-augmented line of products.

Directors of the company include: Paul S. Brallier, R. H. Giebel and W. J. Harshaw.

NOPCO Gives Bonuses

Christmas checks ranging from $10 to $50 were included in the mid-December pay envelopes of employees of the National Oil Products Company. It represented the 34th consecutive year that Christmas remembrances have been given.

Borne-Scrymser Moves

Borne Scrymser Company has removed executive and sales offices from 17 Battery place, N. Y. City, to 632 S. Front st., Elizabeth, N. J. All orders and other correspondence should be addressed to the new headquarters.

This consolidates all activities at one point, as the new office is also the plant location, thereby assuring continuation of prompt service.

Company Briefs

Jungmann & Co., Inc., N. Y. City, has moved offices to 74 Trinity Place. New telephone numbers are Hanover 2-0550, 1, 2.

Monsanto Chemical Co. has purchased the Texas City Sugar Refinery at Galveston, Tex., to be used in the manufacture of chemicals for synthetic rubber.

New research laboratory of Standard Oil Co. of Ohio was opened recently at Cleveland with a public reception and immediately went into action on vital research problems connected with the war.

Defense Courses at "Poly"

In recognition of the need under the existing emergency for specialized training of graduate research workers, announcement has been made by the Graduate Division of "Brooklyn Poly" of the first of a series of intensive graduate courses in engineering science and management defense training. First series, scheduled for completion in eight weeks of two-hour evening sessions, beginning late in January, will comprise four courses and a seminar on ultra-short waves under the direction of Dr. Ernst Weber, research professor of electrical engineering.

On January 5 an advanced training course in the chemistry of powder and explosives, open to male students with three years of college chemistry, including one year of organic chemistry, who desire training as inspectors in powder and armament production, will open under the direction of Prof. Raymond E. Kirk, head, department of chemistry. Both day and evening courses will be offered, requiring six and 12 weeks, respectively, for completion.

OBITUARIES

Howard S. Evans

Howard Salisbury Evans, 65, glass and chemical industrialist, died of a heart attack at his home, 1452 Beechwood Blvd., East End, Pittsburgh, on Dec. 14. He had spent the greater part of his business career in the glass manufacturing industry. Mr. Evans' first association with the industry was when he entered the employ of the Thomas Evans Company, of which his father was president, and the firm, a pioneer Pittsburgh institution, was engaged in the manufacture of lamp chimneys. When the Evans and MacBeth interests were merged into the MacBeth-Evans Glass in 1899, Howard S. Evans became associated with that firm. George A. MacBeth was its president and Thomas Evans, vice-president and treasurer. Thomas Evans succeeded George A. MacBeth as president of the company at the

Howard S. Evans

time of the latter's death in 1916. Thomas Evans died on Dec. 8, 1923, and Howard S. Evans, then vice-president of the company, was elected to succeed his father as president. Mr. Evans continued as president until 1926 when he retired and Mr. George D. MacBeth was elected president of the company.

Howard S. Evans was also one of the founders of the Diamond Alkali Company of Pittsburgh and a member of its board of directors. Since his retirement from the glass manufacturing industry he maintained offices in the First National Bank Bldg., Pittsburgh, where he was active in many lines of enterprise.

Other Deaths of the Month

Dr. James A. Branegan, research chemist and president of the Kali Chemical Co., Philadelphia, died suddenly Dec. 23, at his home.

Ellsworth C. Warner, long a figure in the linseed oil industry, died Jan. 5 at his Palm Beach winter residence. He was 77 years old.

Charles T. White former secretary of the Standard Oil Co. of N. J. died Dec. 18 at his home in South Orange, N. J. at the age of 79.

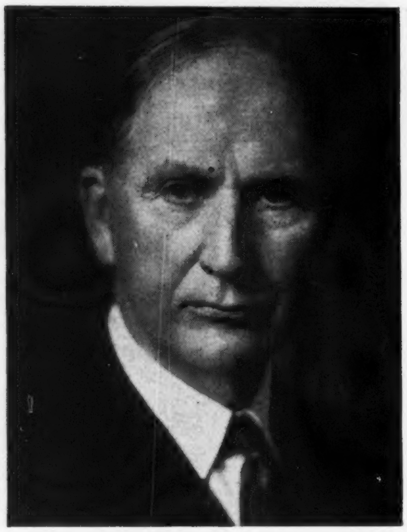
William M. Baldwin, 79, long in the dyewood and tanning extracts field, and widely known Episcopal Church leader, on Jan. 4.

N. E. Bartlett, Penn Salt vice-president, is receiving the sympathy of his many chemical friends upon the death of his wife, Bertha K. Bartlett, on Dec. 15, at their home, 2125 Pine st., Philadelphia. Mrs. Bartlett died suddenly after a brief illness and has been buried in the family cemetery in Easton, Md.

GENERAL

Ittner Gets Perkin Medal

Perkin Medal for '42 was presented Jan. 10 to Dr. Martin H. Ittner, Colgate-Palmolive-Peet at a joint meeting of the American Section of the Society of Chemical Industry, the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society and the Societe de Chimie Industrielle. Dr. Lincoln T. Work presided. Sidney D. Kirkpatrick, Editor, *Chemical and Metallurgical Engineering*, spoke on the personal side of the medallist's life and Dr. Foster Dee Snell, President of Foster D. Snell, Inc., spoke on his technical accomplishments. Medal, which is awarded annually by the American Section of the Society of Chemical Industry for outstanding work in applied chemistry, was presented by Dr. Marston T. Bogert, following which Dr. Ittner gave an address on the subject "Forty-five years of Chemistry in a Soap Plant."



Dr. Martin H. Ittner

Dr. Ittner was born in Berlin Heights, Ohio, on May 2, 1870. He received a B.A. degree from Washington University in 1892, and after two years' additional work there received a B.S. degree. In 1895 he received an M.A. degree and in 1896 a Ph.D. degree from Harvard Graduate School. In 1930 Colgate University conferred on him an honorary D.Sc. degree and in 1938 he received an LL.D. from Washington University.

Pappenheimer Gets Lilly Medal

Dr. Alwin M. Pappenheimer of the New York University College of Medicine has been awarded a prize of $1,000 and a bronze medal of the Eli Lilly Co. for his work in developing a new science combining bacteriology, chemistry, physics and nutrition in the treatment of disease. Award was presented Dec. 30 at the annual dinner of the Society of American Bacteriologists and the American Society of Immunologists and the American Society for Experimental Pathology.

Newton in Hall of Fame

Roy C. Newton, vice-president in charge of chemical research, Swift & Company, Chicago, was placed in the hall of fame of his alma mater, Oklahoma Agricultural and Mechanical College, in special ceremonies commemorating achievements of alumni, Dec. 15. The occasion was part of a three-day observance of the 50th year of the founding of the college.

Exposition Space Going Fast

National Chemical Exposition (Chicago Section of A.C.S.) scheduled for Nov. 17-22, Hotel Stevens, reports 36½% of total space area already contracted for.

"If the war turns out to be a long one, the National Chemical Exposition expects to play an important part in winning it," says Victor Conquest, Chairman of the Exposition Committee of the Chicago Section. "It is generally conceded that the winner in this war will be the country that can advance the fastest technically, with its methods, materials and machines."

Cobalt in *Priorities*

Story of cobalt, one of the imported minerals now on the Government's Priorities critical list, is presented as the leading article in the January number of *Priorities*, house magazine of Prior Chemical Corp. Ancient superstitions relating to cobalt are chronicled as are the steps leading to their gradual dissipation as the chemistry of the metal was slowly unfolded. Characteristics, uses and sources of cobalt are set forth and an interesting side-light is given on the versatility of the early chemist who made the first discoveries of the chemistry of this important metal.

Nichols Bust Unveiled

A bust of the late Dr. William H. Nichols, donor of the chemistry building that bears his name at New York University, was unveiled recently at an informal ceremony. Bust was donated by Mrs. Madeline Sharp, daughter of Dr. Nichols and accepted by Dr. John P. Simmons, director of the Nichols Laboratory in the name of NYU.

ASSOCIATIONS

Junior Engineers Meet

Junior Chemical Engineers of N. Y. City will meet at Childs Restaurant, 109 West 42d st., Feb. 9, at 7:00 p. m. with the New York Section of the American Institute of Chemical Engineers. Dr. Harison Howe, editor of *Industrial and Engineering Chemistry*, will speak on "Chemical Priorities."

A special feature—a Chemical Editors Round Table—will be a discussion of the "Role for the Chemical Engineer in the Present Emergency." Dr. Howe will be at the round table with Walter J. Murphy, editor of *Chemical Industries*, and Sidney Kirkpatrick, editor of *Chemical and Metallurgical Engineering*.

N. Y. Section's January meeting will feature Dr. William J. Hale who will discuss "The War and Chemurgy." The date is Jan. 22 and the place—The Chemists' Club at 6:30 p. m.

CGMA Meets January 26

Twenty-ninth annual meeting of the Compressed Gas Manufacturers' Association, Inc., will be held Jan. 26 and 27 at the Waldorf-Astoria, N. Y. City.

Drug, Chemical Benefit

S. B. Penick, Jr., S. B. Penick & Co., and new chairman of the Drug, Chemical and Allied Trades Section, N. Y. Board of Trade, announces that the Red Cross will receive all net income received from the 17th Annual Banquet, scheduled for March 12 at the Waldorf. In order to make this contribution as large as possible a greatly reduced expense dinner budget has been approved and the price of the tickets substantially raised. In addition, the Executive Committee has voted to make a substantial purchase of U. S. Defense Bonds.

Oscar Lind Heads Salesmen

Salesmen's Association of the American Chemical Industry last month elected Oscar Lind, Dow Chemical Co., president for 1942. Other officers elected were: G. S. Furnam, Merck & Co., vice-president; Phillip LoBue, Michigan Chemical Co., treasurer; Frank Fanning, N. I. Malmstrom & Co., secretary. Jack Remensnyder, Heyden Chemical Co., and J. J. Butler Jr., West Virginia Pulp & Paper Co., were elected executive committee members.

Join Civilian Defense!

American Institute of Chemical Engineers members have been urged by A. B. Ray, chairman of the committee on civilian and industrial protection, to offer themselves in civilian defense for special duties in connection with problems of protection against gas and incendiaries, camouflage work, emergency water and sewage treatment and other problems of a chemical nature. Local defense councils, Ray said, will supply the necessary training and organizing instructions.

Olsen Gets Scholarship

The Hoffmann Scholarship of The Chemists' Club (N. Y.) has been awarded for the school year 1941-42 to Robert T. Olsen, a candidate for the Ph.D. degree in the Department of Chemistry at M.I.T. This scholarship, founded by the late Dr. William F. Hoffmann, is available in alternate years; the stipend is $800, payable in semi-annual installments of $400.

Washington

(Continued from Page 8)

slight increase in prices of carbon black, affecting three large and fourteen smaller companies.

Washington Briefs

The Department of Commerce has set up a Small Business Unit headed up by William Shepardson of New York, former management consultant for manufacturers and distributors.

Price Administrator Leon Henderson has announced that the individual agreements with manufacturers of dry colors, stabilizing prices which were due to expire January 1, have been extended to April 1 with but minor modifications. Under the extension, the agreements are broadened to include pulp colors, certified food colors, dispersed colors, and other similar materials.

The Food and Drug Administration of the Federal Security Agency is now in complete control of the purity and standard potency of insulin.

The Board of Economic Warfare announced December 24 that after January 19 American exporters will be required to have individual licenses for the exportation of a long list of products. Detailed information will be available January 2 when the Superintendent of Documents publishes Comprehensive Export Control Schedule No. 5.

General Preference Order M-11 controlling zinc distribution has been extended to March 31.

To expedite purchasing by the War Department local contracting and procurement officers are authorized to award all contracts amounting to less than $1,000,000 without first sending them to Washington for final approval.

OPM is concerning itself with conserving our tin supply. Spokesmen for the can manufacturers proposed on December 29 to cut consumption from 36,950 tons in '41 to 31,900 tons in 1942 and 28,750 tons in 1943. Manufacturers of chemical specialties including paints are expected to feel the pinch shortly.

There is excellent ground for believing that all or at least many important customs duties between the United States and Canada will shortly be removed as a war emergency measure.

The Marketing Laws Survey has been transferred from the Works Project Administration to the Department of Commerce.

No deliveries of vanadium, including ores, alloys, etc., can be made without OPM approval under order M-23a. Manufacturers of ferrochromium have reduced the specified chromium content to 60-63 per cent. from the former 68-69 per cent. Ceiling prices of acetone, butanol, and ethyl alcohol have been raised substantially.

PERSONNEL

Joseph T. Hall is named executive vice-president and **E. A. Salo** treasurer of Callahan Zinc-Lead—**William S. Richardson** has been appointed general manager of mechanical goods and sundries sales for B. F. Goodrich Co. succeeding **J. H. Connors** who has resigned because of ill health.

Dr. Johan Bjorksten, formerly chief chemist of Ditto, Inc., has been appointed director of laboratories by Quaker Chemical Products Corp., Conshohocken, Pa... **Herbert A. Derry,** for the past five years engaged in selling chemicals to the New England textile trade, has been appointed New England sales representative of W. D. Dodenhoff Co., Greenville, S. C. His offices will be at 94 Howard st., Melrose, Mass.

R. E. Bingman has been appointed district manager for the Indiana territory by the Jessop Steel Co., Washington, Pa. . . **J. H. Hille** has been appointed Chicago District Representative of the Process Equipment Division of the H. K. Porter Co., Inc., Pittsburgh.

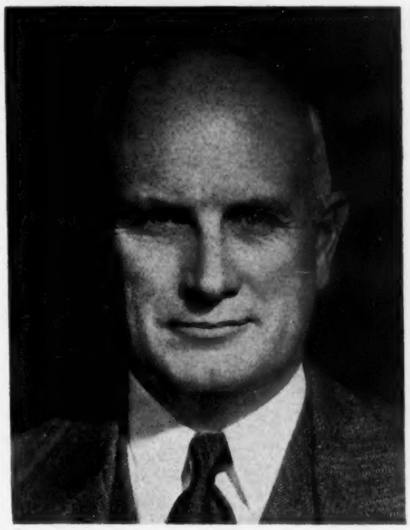
Dr. Howard E. Fritz, manager of the synthetics division of B. F. Goodrich Co. for the past seven years has been named director of research.

Godfrey W. Dyne has been appointed vice-president of American-British Chemical Supplies, Inc., N. Y. City ... **Joel Y. Lund,** vice-president in charge of domestic and foreign production, Lambert Pharmacal Co., St. Louis, has been elected president of the Packaging Institute, Inc.

Charles E. Adams, chairman of the board of Air Reduction Co., U. S. Industrial Alcohol Co. and other companies, was recently made chief of OPM's Iron and Steel Branch.

New Penn Salt V.-P.

George B. Beitzel, manager of sales of Penn Salt, is now vice-president in charge of sales. His career is an example of the success which can come from hard work and steady and unflagging perseverance. He was educated in the public schools of Philadelphia and in the University of Pennsylvania; served in the



Now Vice-President Beitzel

First World War, advancing through the ranks from private to first lieutenant. After the War he spent a number of years with John T. Lewis & Bros. Company, paint manufacturers, and 12 years ago came to the Pennsylvania Salt Manufacturing Company.

Berle on Active Duty

Charles H. Berle, widely known member of Innis-Speiden's sales department, is now Lieutenant-Colonel, Coast Artillery Corps, on active duty at Fort Du Pont, Delaware.

Year-end Statements

These year-end statements by industrial leaders typify the accomplishments and spirit of American Industry at the close of a record year for this great country.

Glass

By H. S. Wherrett
Vice-Chairman, Pittsburgh Plate Glass Co.

Means for relieving shortages of domestic materials, principally metals, have received the attention of glass technicians. The scarcity of some metals has led to the substitution of glass. Doors, fire escapes, ashtrays, signs, partitions, and railings are only a few applications where glass can take the place of critical metals.

Although these represent potential markets for glass products, the glass and paint industries are faced with an actual but temporary loss of markets in the automobile and building industries, their best customers. The enforced curtailment in automobile production by at least 50% has narrowed a very important outlet for glass and paint products. Likewise, the forthcoming curtailment of non-defense building will restrict this important market for these products. Among other adverse factors are the rapidly rising taxes, higher prices for various raw materials, and a general increase in the cost of doing business.

Because of these highly conflicting factors it is more difficult than ever to foretell accurately the course of business over the near future. Too much depends upon such unknowns as the World War situation, and future governmental finance and war policies. But we have solved serious problems in the past and I feel confident that eventually we will emerge from the present chaos and enter a new era of peace and prosperity.

Nickel

By Robert C. Stanley
Chairman and President, The International Nickel Co. of Canada

World nickel production and consumption in 1941 were at an all-time high. The sharp increase in demand arising from the joint British, Canadian and United States war effort required nickel production far beyond anything experienced in the past.

The United States consumed over two-thirds of the world's total nickel output in 1941, as contrasted with an average annual consumption of about one-third during recent years. It is estimated that steel mills in the United States are currently consuming approximately 70% of the refined nickel imported into that country. Of the remaining 30%, foundries are taking 7.3%, brass mills 6.5%, heat resisting and electrical resistance alloys 4.6%, electroplaters 2.5%, and the balance is required for rolled nickel and high nickel alloys and a variety of other products.

All mines and smelters of International Nickel operated at capacity throughout the year and the production rate has been raised in an endeavor to satisfy the unprecedented war-time demands for nickel. To increase its nickel production by 50,000,000 lbs. annually over its 1940 rate and thus make available a substantial additional supply, the Company has undertaken a production expansion program to be completed in 1943 involving an expenditure of approximately $35,000,000.

The prices of nickel in Canada and the United States remained unchanged during 1941 at figures prevailing for over fifteen years. No price revision is anticipated in the immediate future. According to present estimates, over 90% of the nickel now available is being used to fill high priority war orders.

Paint Industry

By Arthur W. Steudel
President, The Sherwin-Williams Co.

Today's mechanized warfare with the hundreds of different types of vehicles and equipment to camouflage and protect has made tremendous demands upon the 1500 manufacturers who make up America's paint industry. But with the war less than a month old, 24-hour production schedules are the order of the day and great ingenuity is being shown by paint technicians to maintain peak production of coatings despite raw material shortages.

With plants already loaded to capacity and working "around the clock," we now add to the needs of our defense production vast quantities of black-out and camouflage paints. A tremendous demand has sprung up since December 7th and our factories are now turning out large quantities of a flat black paint for blacking out industrial plants where windows must be coated on the outside in order to prevent glare and light reflection. Camouflaging of defense plants has brought about a new demand for neutral "concealment" colors which blend in with the landscape. These are now being produced in increasing quantities. These camouflaged colors together with the flat black for window blacking out are being used largely under the direction of Civilian Defense Authorities. The Sherwin-Willams Company has had considerable experience through its English and Australian affiliates with both camouflage and black-out paints and is co-operating actively with the Army and Civilian Authorities in ths important development.

Because of the curtailment of new building during the emergency, it is all the more important that the present existing homes be maintained in good condition. This applies to all types of structures. Good paint and proper painting will protect and preserve these properties.

Magnus, Mabee & Reynard, Inc., recently held its three-day annual sales convention at the Hotel Warwick, N. Y. City. The three Magnus brothers were caught in this jovial mood at the convention. From left to right, J. Magnus, vice-president; Percy C. Magnus, president; and R. B. Magnus, vice-president.

Petroleum

By William R. Boyd, Jr.
President, American Petroleum Institute

Demand for petroleum products in 1941 was by far the greatest in the 80-year history of the industry, amounting nearly to 1,600,000,000 barrels, or almost 10 per cent above 1940. United States consumption alone increased more than 12 per cent. At the end of the year the industry was producing crude petroleum at a rate of more than 4,100,000 barrels a day, with predictions made that rapidly mounting needs would require production of 4,500,000 barrels a day by the middle of 1942, and possibly of 5,000,000 barrels a day by July 1, 1943.

On December 1, 1941 this government-industry cooperation was put on a more formal basis with the appointment of a National Petroleum Industry Council for National Defense, charged by the Coordinator with advising him and considering on its own motion matters relating to the coordination of the industry, and taking any action recommended by the Coordinator. The Council is composed of representative oil men from all branches of the industry.

During 1941 the industry was concerned with a number of potentially serious problems, among them the threat of a deficiency of petroleum supplies on the East Coast, huge additional demands for 100-octane super aviation motor fuel, reduced supplies of raw materials for the manufacture of tetraethyl lead, and the need for high priorities to assure the continuing normal operations of the industry.

To meet these and other national defense emergencies, the petroleum industry spent hundreds of thousands of dollars in new capital expenditures during 1941, for new refining equipment, new pipe lines, and new tankships, along with the regular capital expansion of the industry.

Shipyards turned out many new high-speed tankships in record time during the year, and many others are being built or are on order for oil companies and the Maritime Commission, with completion scheduled for 1942 and 1943.

Two national defense pipe lines—a 250-mile crude oil line from Portland, Maine to Montreal, Canada, and a 450-mile products line from Port St. Joe, Florida to Chattanooga, Tennessee—were completed before the end of the year, and a third products line, 1,260 miles long, from Baton Rouge, Louisiana to Greensboro, North Carolina, is nearing completion.

Capacity of American refineries to produce 100-octane aviation motor fuel increased to nearly 44,000 barrels daily (50,000 barrels or 2,100,000 gallons with a greater proportion of tetraethyl lead) by the end of 1941, and plants sponsored by the Petroleum Coordinator call for quadrupling this huge capacity within the earliest possible time. The present capacity for this one grade of aviation fuel alone is far greater than the total capacity of the rest of the world combined, and is seven and one-half times the U. S. consumption of all grades of aviation fuel as recently as 1938.

Platinum Metals

By Charles Engelhard

President, Baker & Co.

In reviewing platinum for 1941, Charles Engelhard, president of Baker & Co., Inc., states that the outstanding feature of the year has been the rapid growth in the industrial use of platinum metals. More platinum metals are used now in industrial products and equipment than in jewelry, which formerly held a position of first importancse in platinum consumption.

Under present war conditions, Mr. Engelhard intimated that it was inadvisable, if not impossible, to make estimates for 1941 of world production and consumption of platinum metals. He added, however, that it can be stated that the Allied nations practically have both the world's sources and the supply of platinum metals at their disposal.

Commenting on the industrial uses of platinum metals, Mr. Engelhard reports that platinum is used as a catalyst in producing nitric and much of the contact sulfuric. These acids are consumed in large quantities for the manufacture of explosives and other war materials. Palladium is being used increasingly as a catalyst in the hydrogenation of organic compounds and in various other processes. Palladium catalysts permit the use of lower temperature and pressure than catalysts made of the base metals.

Glass wool fiber for insulation and other similar purposes is made from molten glass which is passed through small orifices in platinum metal alloy feeder dies. These alloys are used because of their resistance to oxidation, abrasion and chemical corrosion. Platinum alloys also perform a most important function in producing rayon fiber. The viscous solution is extruded under pressure into an acid bath through platinum metal alloy spinnerettes having very small holes that must retain their contours and dimensions despite severe corrosive action.

In the production of electrochemical products, such as potassium perchlorate and persulfuric acid, platinum is used for the exposed surfaces of insoluble anodes. The new platinum-clad metals which comprise a protective layer of platinum bonded to nickel, or other metal, in such forms as tubing and sheet, are being employed in electrochemical processes, and they are being adopted elsewhere in chemical industries for heat exchangers and similar apparatus.

With the exception of iridium, prices for the platinum metals remained practically unchanged during 1941. Iridium, which was quoted at $275 per ounce at the beginning of 1941, dropped to $175 an ounce in February and remained at approximately that figure during the remainder of the year. Platinum was quoted from $36 to $38 per ounce throughout the year, against a range of $36 to $40 in 1940. Palladium, at $24 per ounce, has remained stable in price since 1935. Rhodium continued to be quoted at $125 per ounce, the same quotation prevailing since 1937. At $35 to $40 an ounce, there has been no change in the price range of ruthenium since 1938.

CHEMICAL SPECIALTY News!

NAIDM Clears Up Priority Assistance Problems of Members—NOPCO Employees Attend Industrial School Sessions—Tidy House Opens General Offices—Pest Control Operators Hold Meetings

In reply to inquiries from members of the National Association of Insecticide & Disinfectant Manufacturers, Inc., wanting to know why they were not on the list of preferred manufacturers who were granted priority assistance in obtaining scarce materials by Preference Rating Order P-87, the association recently issued a clarifying bulletin. Washington consultant of NAIDM has informed that the order is applicable only to primary producers and any firm that is a primary producer can qualify under the following conditions:

(1) It must be substantially engaged in the manufacture of a chemical or chemicals used as insecticides, fungicides or disinfectants necessary for producing foods. (2) It must be a primary chemical producer, not a mixer or a compounder. (3) It must also be a distributor.

Any firm so qualified, it was explained, will get an A-10 rating. Materials covered by the P-87 order were defined as follows:

"Insecticides, germicides and fungicides are defined in the order as chemicals or mixtures of chemicals to be used for the following purposes, provided they are in connection with the production of food:

(1) Spraying, dipping, dusting or fumigating domestic animals, seeds, tubers and bulbs, growing plants, stored products and buildings for the purpose of controlling destructive insects, fungi and bacteria.

(2) Disinfecting soil, farm buildings, dairy implements and machinery, cattle and poultry cars."

NOPCO Employees Attend School Sessions

Laboratory and plant employees attending the opening session of the mid-winter semester of the National Oil Products Co.'s industrial school were urged by James Fritz, chief chemist of the firm's Paper Division, to be constantly on the lookout for new developments to help overcome serious shortages which have developed in the paper industry in America.

Problems of the paper and pulp manufacturer are highlighting the current semester, which runs through Feb. 2.

Started back in 1936, by Thomas A. Printon, vice-president, as an instruction course for individuals who later might be sent out as salesmen for the company, the NOPCO industrial school has widened in scope in the past several years, its objective now being to familiarize all employes, from research chemists in the laboratory to clerical help in the office, with the operation of the various industries served by the firm.

In addition, the industrial school this year has thrown open its doors to outsiders and interested employes of firms in the particular fields covered by the course. About 25 "students," most of them graduate chemists, have enrolled in the course, Mr. Printon said.

In the past, courses have been offered in leather, rayon, cotton, silk wool, dyeing and finishing, metal working and dry cleaning.

The staff of instructors for the current course on paper and pulp manufacture includes Mr. Fritz, chief chemist in the paper division; Clark Snook, chemist in the NOPCO paper laboratory, and Walter Morehouse, manager of the paper division.

"De-Inking of Waste Papers" was the subject of the opening class Dec. 1, which was presided over by Mr. Fritz. Other classes are dealing with Wood Pulp, Straw Pulp, Stock Preparation, Paper Machines, Materials Other than Fibres, Testing Grades, Special Machine Operations, Paper Converting, Converting of Paperboards and Glues and Adhesives.

One of the unusual aspects of the NOPCO industrial school is the manner in which classes are conducted. Although it is handled like a school in that records of attendance are kept; quiz papers are graded and recorded and outside reading is assigned as "homework" by the various lecturers, the classes themselves are quite informal, many of them leading into the company laboratory for explanatory experiments.

A final, written examination is held during the closing session of the course and papers are graded and corrected by the instructors before being returned to the "students." In addition, motion pictues and question-and-answer periods help to enliven the proceeding at the company industrial school.

New Chipso Product

New, condensed Chipso, product of Procter & Gamble, Chemical Division

New Tidy House Offices

Tidy House Products, Inc., Des Moines, Ia., makers and distributors of cleansers and polishes, recently established general offices at 2109 Ingersoll Ave.

Botany Fluid Not For Sale

Botany Products division of Botany Worsted Mills has withdrawn Botany Cleaning Fluid from sale for the duration of the war.

Pest Control Operators Meet

Two conferences of interest to pest control operators were featured in January. First was the Sixth Annual Purdue Pest Control Operators Conference, Jan. 5, 6, 7, 8, and 9 at Purdue University, Lafayette, Ind. Second was the Second Eastern Pest Control Operators Conference at Massachusetts State College, Amherst, Mass., Jan. 12, 13, and 14.

Professor J. J. Davis and his staff arranged the program of the first conference and Professor Charles P. Alexander and his staff were responsible for the second.

Company Briefs

Merkin Paint's year-end bonuses to executives and employees exceeded \$20,000 —Owens-Illinois Glass Co. has set aside \$1,300,000 out of 1941 earnings as the basis for a fund to provide an income for employees who retire after years of service.

 Prepared Monthly by U. S. Industrial Chemicals, Inc.

U.S.I. CHEMICAL NEWS

January ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1942

Progress in Many Chemical Fields Reported in 1941

Major Developments Outlined in U.S.I. CHEMICAL NEWS

That 1941 was an outstanding year of progress in the chemical industry is indicated by a brief review of the major developments summarized in the past year's issues of U.S.I. CHEMICAL NEWS. Among the topics discussed in leading articles in U.S.I. CHEMICAL NEWS during 1941 have been the following:

January. Special-purpose adhesives. New preparations for preventing dermatitis.

February. Industrial applications of "DRY-ICE." New uses for ethyl oxalate in lubricating oils.

March. U.S.I.'s plant and product development program. Printing inks for aluminum foil.

April. Applications of ethyl cellulose. Lacquer coatings for automobile panels.

May. Revised nomenclature for chemical products. Reactions of ethyl formate.

June. Applications for ethyl chloroformate in organic synthesis. Matte finishes for coated fabrics.

July. Novel applications of alkyl phthalates. New process for improving drying properties of oils.

August. Ethyl oxalate in organic synthesis. Use of Solox to lower freezing point of terpineol.

September. Developments in the petroleum industry. Use of "DRY-ICE" in keeping aluminum rivets workable.

October. Acetoacetarylides as dye intermediates. Availability of natural resins.

November. Revised formulation for Solox. Simple method of estimating moisture in soil.

December. Use of fusel oil in lacquer formulations. Impregnated cloth as replacement for window glass.

Copies of 1941 issues of U.S.I. CHEMICAL NEWS *are available for free distribution to readers wishing further information on any of the subjects in this list.*

Chemical Reactions of Urethan Suggest Many Fields for Study

Potentialities of U.S.I. Product in Organic Synthesis Point To Broadening of Its Demonstrated Pharmaceutical Utility

Already established as a valuable ingredient in pharmaceuticals by reason of its soporific, sedative, and anti-spasmodic properties, urethan (ethyl carbamate) gives every indication of far greater potential utility as an intermediate in organic synthesis. The variety of unusual organic compounds that can be prepared by means of its known chemical reactions suggests many interesting fields for further study. Until comparatively recently, exploration of urethan's potentialities was hampered by the fact that it was available in commercial quantities only from foreign sources. At the present time, however, U.S.I.'s production of this interesting chemical compound permits thorough investigation of its utility.

Chemical Reactions of Urethan

Among the chemical reactions of urethan are:

1. With metallic sodium it gives sodium urethan, from which numerous compounds can be derived by double decomposition.
2. With chlorine there results dichloroethylidenediurethan or N-chlorourethan, depending upon the conditions.
3. Urethan condenses with aldehydes in the presence of KCl to give alkylidenediurethans; with formaldehyde it gives methylenediurethan and anhydroformaldehyde urethan. In the presence of barium hydroxide it gives N-hydroxymethylurethan.
4. With chloral it gives chloralurethan and trichloroethylidenediurethan.
5. With phosgene it gives chloroformylurethan, ethyl allophanate, and carbonyldiurethan.
6. With ethyl acetoacetate it gives ethyl N-carbethoxy-beta-aminocrotonate.
7. With sulfuryl chloride it gives ethyl allophanate; sulfuryl chloride on sodium urethan gives sulfuryldiurethan.
8. With oxalylchloride, it gives oxalyldiurethan.
9. With ethyl chloroformate (chlorcarbonate) it gives diethyl imidocarboxylate (N-carbethoxyurethan) and tricarbethoxyamine (N, N-dicarbethoxyurethan).

In addition to its uses in chemical synthe-

(Continued on next page)

Mr. C. E. Adams, Chairman of the Board of U.S.I., has been named Chief of the Iron and Steel Division in the Office of Production Management, and assumed his new duties on December 11.

Alkyl Phosphates Offer Unusual Possibilities

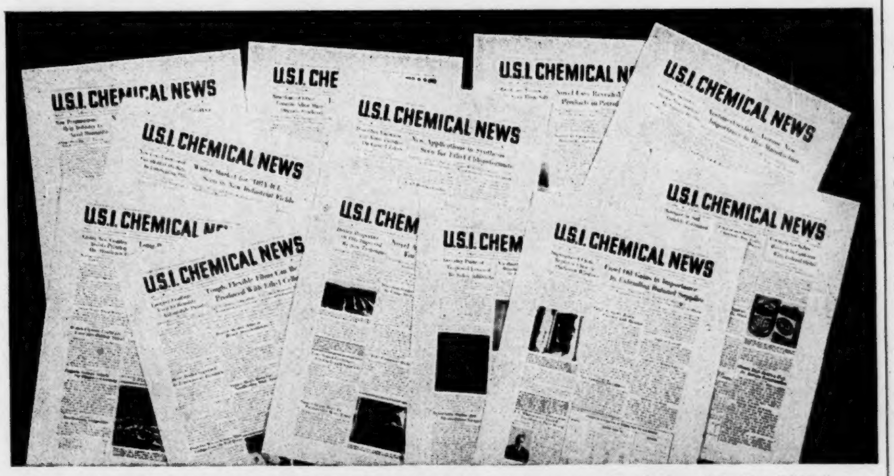
The use of alkyl phosphates offers industry many interesting possibilities because of their good water solubility, humectant properties, conductivity and stability coupled with low freezing points and mild corrosive action.

As these phosphates have the added advantages of not oxidizing or discoloring on aging, they appear well suited as anti-static agents for the spinning of wool and other fibers. The amyl sodium potassium type apparently does not alter the particle size of vat pigments adversely and performs well as humectants in vat printing pastes. Ethyl ammonium phosphate is an excellent flame proofing agent.

A means of making such alkyl phosphates is by the reaction of the lower aliphatic alcohols with phosphorus pentoxide.

Describes Anti-Halation Coating for Photo Films

PARLIN, N. J.—A light-sensitive photographic film, having a water-insoluble removable backing containing a dye which is absorptive of light of all wave lengths to which the film is sensitive, has been patented by an inventor here.



Many of the outstanding chemical developments of the past year were discussed in the 1941 issues of U.S.I. Chemical News. The most important subjects are listed in the article above.

Ethanol Found Effective In Protecting Cellulose

When tested in various mixtures with water, ethanol is reported to have shown a distinct protective action on cellulose in recent experiments. Unbleached cotton was sealed in an evacuated tube with 100 cc. of water and ethanol in mixtures ranging from pure water to pure ethanol, then heated four hours at 180° C.

In pure water, the linters showed considerable loss of alpha cellulose and the product was light yellow in color. In pure ethanol, it was white and only slightly discolored. Decomposition may have been brought about by the weak acidic nature of water at the temperature used, it is reported. Intermediate solvent mixtures showed a distinct protecting effect of ethanol, possibly because of association of water with that chemical.

January ★ U.S.I. CHEMICAL NEWS ★ 1942

Mix Ethylene Oxide With "DRY-ICE" as Fumigant

When mixed with carbon dioxide in the form of "DRY-ICE"*, ethylene oxide has been found to be highly effective as a fumigant for controlling insect pests in elevator grains. Although somewhat expensive and laborious to apply, the mixture leaves no odor, is non-inflammable, and does not affect the milling and baking qualities of the wheat. It does, however, reduce the germination of wheat to a small extent.

Three pounds of ethylene oxide are mixed with 30 pounds of carbon dioxide in the solid form and this quantity introduced into the grain for each 1,000 bushels at the point where it enters the bin. The mixture is carried down with the grain and becomes thoroughly distributed throughout the grain column. Here it soon changes to a vapor that kills all insects present.

The "DRY-ICE" is prepared for use by being broken into small pieces in a box from which it can be shoveled easily into the containers in which the mixture is carried to the grain. Ethylene oxide is poured over it in the proportion of one pound to each ten pounds of "DRY-ICE."

* Pure Carbonic, Incorporated, sells "DRY-ICE" manufactured by U.S.I.

Applications of Urethan

(Continued from previous page)

sis, urethan displays properties that are of interest in other fields. For example, reports from abroad indicate that urethan increases the solubility of riboflavin. Patent papers disclose urethan's effectiveness as a fixative in dyeing human hair. Its physiological properties have led to many applications in pharmaceuticals, where it is used for the treatment of insomnia, eclampsia, tetanus, convulsions, spasmodic conditions, and whooping cough. It is reported to be effective as an antidote in strychnine, resorcinol, and picrotoxin poisoning.

In biological applications, urethan is used to anesthetize fish and aquatic mammals as a preliminary to hypodermic injections or operations.

Method of Manufacture

Since urethan is prepared by the reaction of ammonia with ethyl chloroformate, one of the important factors in its production is the availablity of supplies of ethyl chloroformate. As a leading producer of the last named compound, U.S.I. is also in a favorable position to produce urethan.

Films Kept Wrinkle-Free By Ethyl Acetate Vapor

HARTFORD, Conn.—The use of ethyl acetate vapor for removing wrinkles from films is recommended by an inventor in this city in describing a process for forming films from cellulose derivatives. Process is claimed to be quicker than previous methods, to reduce the tendency of bubble formation, and to produce thicker films in a single dipping.

During the drying period, the films are treated with ethyl acetate at intervals by holding them in the vapor provided by heating a quantity of the ethyl acetate. The ethyl acetate vapor condenses uniformly on the films and softens their surfaces, thus removing wrinkles or incipient wrinkles.

Halogenation Protects Surface of Rubber Parts

AKRON, Ohio—For use where appearance of rubber products is an important factor, a method involving halogenation of parts molded from rubber compounds has been patented by an inventor here which is said to provide a lustrous, smooth surface which resists the absorption of gasoline, oil or other ordinary rubber solvents together with the action of the elements, oxidation and sun checking.

After halogenation has been carried out, the parts are placed in a 5% sodium thiosulfite solution where it is desirable to stop a continuing action. The parts are next rinsed in water, dried, and rinsed in ethanol. After another drying, they are ready for polishing.

Plasticizes Electrolyte By Using Ethylene Glycol

NEW ROCHELLE, N. Y.—The use of ethylene glycol as a plasticizer is advised in a patent granted to an inventor here for a conductive, film-forming hydrogenated tree resin electrolyte for dry electrolytic condensers.

This electrolyte is claimed to be more resistant to heat and to oxidation and more stable than previous types of electrolytes. In addition, this electrolyte is reported to possess a high degree of fluidity which properly facilitates the impregnation of wound condenser sections.

When properly prepared, this electrolyte is said to be a very viscous, plastic, varnish-like material.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Flexible thermoplastic tubing is said to offer a satisfactory substitute for copper and other metal tubings. It is described as extremely tough, flexible, semi-transparent, resistant to moisture, brines, solvents, acids, and alkalis. **(No. 530)**

U S I

A waterproofing compound penetrates pores of concrete, brick, stone, or wood, sealing the materials against moisture, it is reported. Maker says that it can be mixed with dry colors or colors in oil, and that it can also be used to protect iron and steel against attack by many chemicals. **(No. 531)**

U S I

A synthetic drying oil, made by a selective distillation process, is said to have an extremely high iodine value. According to the manufacturer, it is compatible with all resins, can be used to supplement oils with lower iodine values, is useful in fortifying dehydrated castor or bodied linseed. **(No. 532)**

U S I

A new paint, made with a chlorinated rubber base, is designed specifically for the protection of exposed steel, iron, aluminum, copper, and galvanized metal, it has been announced. Paint is said to give exceptional resistance to acids, alkalis, and fumes. **(No. 533)**

U S I

A skin protective is described as a liquid which dries in two minutes, covering the hands with a thin, non-permeable, elastic film. Novel feature of the film is a visible luster, which quickly indicates any uncovered spots. **(No. 534)**

U S I

New textile printing pastes are reported to make available with soluble dystuffs the fine printing qualities associated with pigment colors previously developd by the same manufacturer. Process is available under license. **(No. 535)**

U S I

Precision-bore glass tubes are said to be suitable for use as consistency tubes in the testing of lacquers; in viscosimeters, manometers, flowmeters, colorimeters; and in many other applications where precise inside diameters are necessary. Available in round, square, conical, and with inside thread. **(No. 536)**

U S I

A new liquid adhesive can be employed on leather, wood, paper, fiberboard, fabrics, and plastics, it is reported, and can be used to bond similar or dissimilar materials together. Adhesive consists of residual solids in a volatile carrier. **(No. 537)**

U S I

A paint remover can be used also on enamel, lacquer, varnish, and shellac, according to the maker. Material is said to leave no wax residue, to require no washing of surface after removal, to be harmless to wood or metal. **(No. 538)**

U S I

A new liquid is said to penetrate rust and hardened sealing materials, in order to facilitate the removal of nuts, bolts, joints, and cover-plate connections. It does not attack metal, according to the maker. **(No. 539)**

(*Continued from Page 58*)

Price Ceiling Announced for Used Cotton & Burlap Bags

Second hand burlap and cotton bags cannot be sold for more than the highest prices that prevailed during the period November 15-December 6, under the provisions of a new emergency ceiling schedule issued recently by Leon Henderson, Administrator of the Office of Price Administration.

Mr. Henderson cited the following factors as reasons why immediate action by his office was imperative:

1. Used bag prices, which have doubled since the start of 1941, are now threatening to get completely out of hand, especially on the West Coast, where flagrant profiteering and hoarding already have appeared.
2. Urgent demands from the Army and Navy for sandbags have been superimposed upon the existing heavy requirements for bags to package industrial and agricultural products.
3. Burlap imports are in danger of being completely interrupted by the war situation in the Far East.
4. Production of new cotton textile bags cannot be increased fast enough to make up for the threatened burlap deficiency.

OPM Restricts Use of New Burlap Bags to Packing Agricultural and Chemical Products

Allocation of our entire burlap supply was ordered on Dec. 22, 1941, by the Office of Production Management.

All of our burlap comes from India. Three-fourths of it is now used to bag agricultural and chemical products. The remaining one-fourth is used by the furniture, upholstery, rug and carpet, textile, meat-packing, and rubber industries.

Under the order, agriculture and chemicals will continue to receive burlap but in greatly reduced quantities. The other peace-time uses will be cut off entirely.

Much of the burlap will be used for defense purposes—for sand bags as protection against bombings and for camouflage.

The order applies to burlap now in this country in inventory and to future deliveries, with the exception of broken bales on which there is no restriction.

Unbroken bales now in inventory may be used for bags for agricultural and chemical products. None of it may be used for the other peace-time uses.

Burlap now en route to this country as well as future deliveries will be dealt with differently and more drastically. Two-thirds of it will be set aside in a stockpile over which OPM will have control. Army, Navy and civilian defense will have first call on it. If any is left, it may be made available for bags for agricultural and chemical products and for hardship cases.

The remaining one-third will be used for the manufacture of bags for agricultural and chemical products.

The order sets up a system of quotas for importers, importing bag manufacturers, and non-importing bag manufacturers.

The quotas for importers apply to burlap shipped from Calcutta on and after January 15, and are based on their average annual imports during the period from 1935 to 1939 inclusive.

Quotas for non-importing bag manufacturers become effective January 1, 1942, and are based on their burlap purchases in 1939 and 1940.

Bag manufacturers are required to distribute bags to their 1941 customers in the same proportion as they did in 1941.

Slashing or mutilating bags in opening them is prohibited.

Inventory of any importer, importing bag manufacturer, or non-importing bag manufacturer is restricted to a 30 days' supply.

An amendment was issued on Dec. 31, 1941, by the Office of Production Management to this burlap conservation order explaining how burlap importers and importing bag manufacturers shall dispose of the burlap which is required to be set aside.

The incoming burlap which is to be set aside should be disposed of as follows:

1. To fill any order bearing a rating of A-1-j or higher.
2. To fill any order for burlap to be used for sandbags or camouflage cloth placed by the Army or the Navy.
3. To fill any order by the Defense Supplies Corporation or other affiliate of the Reconstruction Finance Corporation.
4. To fill any order placed by a non-importing bag manufacturer to fill orders for the Army and Navy or for orders bearing a rating of A-1-j or higher.

Army Packaging Materials Are Salvaged for Re-use or Sale

Quartermasters at all Army posts, camps and stations have been instructed to save for re-use or sale all wooden and paper containers and burlap, osnaburg and other materials used in packing supplies delivered to the Army. Wherever the salvaged containers and packing materials can be used locally or at some nearby Army facility, they are saved to conserve new materials which have become increasingly difficult to obtain. When not needed for use by the Army, the surplus is disposed of by the local Quartermaster on sealed bids after advertising—or it may be sold on indefinite quantity contracts extending for periods not to exceed one year.

Much of the burlap and osnaburg salvaged by the Quartermasters is used in the clothing and equipage repair shops. Fibre containers, not needed for Army use usually are collapsed for ease in handling and advertised for sale in rather sizeable quantities. Wooden boxes, hampers, egg crates and other packages generally are sold in the form in which they are received. These bulky containers which require considerable storage room, often are sold upon contracts requiring that the buyers remove their purchases at frequent intervals.

Quartermasters are instructed to salvage all saleable materials.

OPM Considering Means of Reducing Tin Consumption in Cans

Ways and means of reducing the quantity of tin used by can manufacturers were discussed recently at an all-day meeting of the Conservation subcommittee of the Can Manufacturers Industry Advisory Committee with OPM officials.

At a meeting of the full committee on December 16, OPM asked the committee to study the tin conservation problem and to submit recommendations thereon. Responding to that request, the Conservation sub-committee recently submitted a definite program providing for a reduction of tin used by the industry from 36,950 tons in 1941 to 31,900 tons in 1942 and 28,750 tons in 1943. Under this program, the quantity of tin available for packers' cans would be reduced from 28,000 tons in 1941 to 26,400 tons in 1942 and 24,300 tons in 1943. Tin for general line cans (beer cans, oil cans, etc.) would be reduced from 8950 tons in 1941 to 5500 tons in 1942 and 4450 tons in 1943.

The recommendation also calls for an allocation of 3260 tons of tin a month to the industry for the first eight months of 1942, and 1575 tons a month for the remaining four months.

Representatives of the OPM steel branch warned that the amount of steel plate allocated to the can industry may be cut. So far the can manufacturing industry has not been affected.

J. R. Taylor, OPM presiding officer, discussed with members of the industry the probable elimination of tin cans for certain products and sharp reduction in the use of tin for containers for still other products.

No action was taken at the meeting, in keeping with OPM's policy that industry advisory committees make recommendations for OPM's consideration but do not establish policy. A final decision on what is to be done will now be worked out by the OPM.

GLYCERINE, ITS COMPOUNDS AND USES

By BENJ. LEVITT

(*Continued from Page 37*)

OFFICE OF PRICE ADMINISTRATION

Price Schedule No. 38

Effective Nov. 10, 1941

The following maximum prices are established for glycerine:

(A) REFINED GLYCERINE

(1) C. P. glycerine (98 per cent glycerol).

(I) Tank cars, .18½ per pd. dld.
(II) Drums, carload lots, 18¾ per pd. dld.
(III) Drums, less carload lots, .19¼ per pd. dld.

(2) C. P. glycerine (U. S. P. 95 per cent glycerol.).

(I) Tank cars, .18 pd. dld.
(II) Drums, carload lots, .18¼ per pd. dld.
(III) Drums, less than carload lots, .18¾ per pd. dld.

(3) Dynamite.

(I) Tank cars, .18 per pd. dld.
(II) Drums, carload lots, .18¼ per pd. dld.
(III) Drums, less than carload lots, .18¾ per pd. dld.

(4) High gravity.

(I) Tank cars, .18 per pd. dld.
(II) Drugs, carload lots, .18¼ per pd. dld.
(III) Drums, less than carload lots, .18¾ per pd. dld.

(5) Yellow distilled.

(I) Tank cars, .18 per pd. dld.
(II) Drugs, carload lots, .18¼ per pd. dld.
(III) Drums, less than carload lots, .18¾ per pd. dld.

The above prices established for refined glycerine in this paragraph (A) are applicable to deliveries in zones A and C. For deliveries of refined glycerine in zone B, the maximum price shall be the maximum price for deliveries in zones A and C plus 2c pound.

(B) CRUDE GLYCERINE.

(1) Soap lye (basis 80 per cent glycerol).

(I) Tank cars, .11½ per pd. dld.
(II) Drums, carload lots, .11½ per pd. dld.
(III) Drums, less than carload lots, .11½ per pd. dld.

(2) Saponification (basis 88 per cent glycerol) to refiners.

(I) Tank cars, .12¾ per pd. dld.
(II) Drums, carload lots, .12¾ per pd. dld.
(III) Drums, less than carload lots, .12¾ per pd. dld.

(3) Saponification (basis 88 per cent glycerol) for individual uses.

(I) Tank cars, .12¾ per pd. f.o.b. point of manufacture.
(II) Drums, carload lots, .13¾ per pd. f. o. b. point of manufacture.
(III) Drums, less than carload lots, .14¾ per pd. f. o. b. point of manufacture.

(4) Crude glycerine of glycerol percentages other than those listed above.

Maximum prices of crude glycerine, of glycerol percentages other than those listed above, in tank cars and drums (carload lots and less-than-carload lots), shall be determined at the rate of 11½c per pound delivered for glycerine of 80 per cent glycerol content.

(c) When used in this schedule the term
(1) Zone "A" means:

All points east of and including North Dakota, South Dakota, Nebraska, Kansas, Omaha, Teas; Laramie County, Wyoming; Colorado, east of but not including the following counties: Jackson, Grand Gilpin, Jefferson, Douglas, Teller, Fremont, Custer, Huerfano, Costilla.

(2) Zone "B" means:

The territory between zone A and zone C, as follows: Washington, east of and including the following counties: Okanogan, Chelan, Kittitas, Yakima, Klickitat; Oregon, east of and including the following counties: Hood River, Wasco, Jefferson. Deschutes, Klamatchc; Nevada, Arizona, New Mexico, that part o Colorado west of and including those counties mentioned above; Utah, Wyoming, excepting Laramie County, Idaho, Montana.

(3) Zone "C" means:

The territory west of zone "B."

AGRICULTURAL RESEARCH LABORATORIES IN OPERATION

(*Continued from Page 63*)

thereof. Such research and development shall be devoted primarily to those farm commodities in which there are regular or seasonal surpluses, and their products and byproducts." (Public No. 430, 75th Cong.)

The laboratories are following the path that was laid out for them in the enabling act as nearly as it is possible to do by working on the products and byproducts of the greatest economic importance in the respective regions and of which there are often regular or seasonal surpluses. Previous issues of CHEMICAL INDUSTRIES have listed the commodities to be studied in the early research program in each of the four laboratories, as follows:

Northern Laboratory	**Southern Laboratory**
Corn	*Cotton*
Wheat	*Sweet Potatoes*
Agricultural Residues	*Peanuts*

Eastern Laboratory	**Western Laboratory**
Tobacco	*Fruits*
Apples	*Vegetables*
White Potatoes	*White Potatoes*
Milk Products	*Wheat*
Vegetables	*Alfalfa*
Animal Fats and Oils	*Poultry Products and Byproducts*
Tanning Materials, Hides and Skins	

Considerable research in these laboratories is centering around defense activities. Defense activities under present conditions comprise not only those lines of research directly related to military operations, but also the secondary problems that arise in connection with the needs of the civilian population as well as the military forces. The recent speed up of research on dehydration of vegetables to improve flavor, texture and packaging, and the research under way to utilize surplus cotton in the production of smokeless powder are good examples of the part these laboratories are playing in national defense.

PERSONALITIES IN CHEMISTRY

By A. D. McFADYEN

(*Continued from Page 33*)

their findings and assisting in every possible way. Nikitin believes that the work of these scientists at the Agricultural Experiment Stations has had the greatest influence on the continued progress of agriculture in the United States and that this is strikingly evident at this time of increasing demands on the nation's production of agricultural products. As part of this program Nikitin observes first hand the progress throughout the land, visiting the Experiment Stations, observing results of tests of new insecticides and fungicides, and freely exchanging information. Last year alone he visited Experimental Stations in forty-four of the forty-eight states.

Soil deficiencies of the rarer elements has taken an important place in Nikitin's studies. It has been found that deficiency of rarer elements results in various plant diseases, particularly in regard to truck crops such as celery, tomatoes and onions. Progress has been made by the Tennessee Corporation in producing materials to correct these deficiencies. Copper, zinc and manganese salts are now being used on muck soils in Michigan, New York, and Florida, with sandy soils of the southeastern states, and on the alkaline soils in the semi-arid areas, to maintain the essential supply of these elements.

Nikitin is author of numerous papers concerning fungicides and the use of the minor essential elements in the correction of soil deficiencies. United States patents have been issued covering various fungicides, insecticides and parasiticides devised by him.

Nikitin is a member of the American Chemical Society American Association for the Advancement of Science, the Chemists' Club, American Phytopathological Society, and several State Horticultural Societies. He holds the rank of Captain in the United States Chemical Warfare Reserve. He is an honorary member of Sigma Xi. Skating and golf are Nikitin's favorite exercises, his score in golf being consistently in the low nineties. This blue-eyed, delightful man, with a voice for all the world like that of the cinema star, Charles Boyer, thus far has escaped matrimony.

NEW EQUIPMENT

(*Continued from Page 55*)

piston assembly are attached to the valve body by a union bonnet nut, which makes removal for inspection a simple operation.

Magnetic operating principle eliminates the use of stuffing boxes, bellows, diaphragms, or rotary shafts to gain switching action. This is said to assure positive operation since there is nothing to stick, bind, break, or clog up. Installation can be made wherever a check valve will operate. Its design is such that operation is not affected by the presence of vegetation in the water.

Units are available in a complete range of standard pipe sizes up to 4″ and the standard equipped mercury-to-mercury electrical switch is rated at 15 amps., 125 volts, 10 amps., 250 volts.

Priorities for Furnace Parts

Material for production of repair and replacement parts to fill defense orders may now be acquired under Preference Rating Order P-74, issued to manufacturers of furnaces for the heat treatment of metals, according to an interpretation by the Priorities Division.

Between the Lines

War in the Pacific Brings Many Immediate Changes on the Nation's Economic Life—These Are Surveyed and Analyzed By the Members of the Editorial Staff of *Chemical Industries* Who Will Continue Kenneth Tator's Feature While He Is in the Government's Service in Washington Connected with the OPM.

HEADLINES on the Pacific war deal almost solely with fighting in the Philippines, in the Malay peninsula, Borneo, Indo-China, and with attacks on shipping, or other combat incidents. When translated into terms of the effect of this war on the nation's economic life, and its industries, especially the chemical industry, the results are less obvious in headlines, but will be felt just as keenly in the near future by the layman, as if the news were blazoned across the page.

This is confirmed by the fact that a considerable part of OPM and OPA activity at the moment is concerned with economic results of that fighting. Examine a brief list of chemicals and allied products that are imported by the United States in quantity, and a surprisingly large number originate in the jungles of Malaya, the go-downs of Hong Kong native brokers, or the dock warehouses of Dutch Java, not to mention the Philippines and other parts of the Orient.

A Long List

Such a list includes gums, resins, crude and seed lac, unbleached shellac, crude drugs, tung oil, industrial chemicals, paint and dye materials, minerals, metallic chemicals, tin, fats and oils, rubber, spirits or materials for spirits.

The Japanese forces at this moment occupy the principal tin-producing areas of Malaya; hence the United States, with an estimated supply sufficient to meet emergency needs for an indefinite time only if rigidly conserved, has assumed control of the supply and distribution of imports of tin at hand.

Similarly supplies of the major items under fats and oils are under temporary rigid control of OPM; similarly automobile tires of rubber, all of which comes from the Orient, are going out of reach of the public; diversion of sugar into production of high-test molasses for alcohol manufacture will be reduced to a minimum henceforth, because reserve supplies of sugar from the Orient may be hard to obtain, hence alcohol and rectifying activities are involved. A major effect of the rubber situation is forecast as the development of a synthetic rubber industry in this country.

Conversely the countries of the Orient and Far East generally, have up to now been good customers for American chemicals, even in competition with cheap Japanese products. As the war encroached more and more, reports have been trickling in from American observers abroad, which need to be pieced together to give a picture of what is taking place.

Philippines a Good Market

The Philippines have been a market for chemicals, drugs, medicinal preparations, soap, toilet preparations, paints, varnishes, explosives and fertilizers. The outbreak of war found Island authorities however, in the midst of experiments in developing botanical plants in sufficient quantity to meet requirements for domestic manufacture of essential oils. In contemplation was a plant to distill oil from citronella grass and other oils; another plant was in prospect for commercial production of oil from patchouli roots and cinnamon bark.

In Java, and particularly in British India, reports had become increasingly frequent, concerning attempts to develop a degree of self-sufficiency variously in certain chemicals, paints, fertilizers, toiletries and raw materials for compounds. Up to the points of the current hostilities in this area such enterprises were promising, but still depended to a marked extent for materials from outside, including the United States. Whether these efforts might have carried into future peace times and thus permanently deflected a part of our chemical exports was speculative even before war broke, because of the lack of highly skilled technical services in many of these enterprises. However, the war has interrupted many of these, and threatens others.

It has also interrupted or ended what were promising new avenues for American products. Thus, normally France dominated Indo-China's markets, and under old conditions, American products would have had little chance. Due to European hostilities the French lost their natural hold, and imports of chemicals from the United States had recorded a marked increase in 1940 over the previous year, including principally ammonia, phenol, calcium carbide, chloride of lime, iodine, acetone, acetic, formic and citric acids, mercuric chloride, zinc oxide, sodium sulfate, bismuth carbonate, bismuth nitrate and bismuth salicylate, potassium bichromate, chrome alums, copper sulfate, magnesium chlorate, benzoic acid, acetylsalicylic acid, insecticides, fungicides, alizarine colors and dyes.

Ths covers quite a range, but the total had not attained impressive size up to the war's interruption. In the Netherlands Indies a strong paint industry had developed, ranking with soap manufacture, most of which was for domestic use, and the fifteen paint plants there had been drawing increasingly on the United States for raw materials and other ingredients.

Here also, there was a promising prospect for American dyes and colors, replacing former European sources. Restrictions on imports using up foreign exchange balances, and particularly dollar balances, had handicapped this trade for the moment, but the war came just as some easing of these restraints was under consideration.

As a sidelight, and perhaps a selfish one, the present situation has not only interfered with development of budding American markets, but, as typified in the case of the naval stores industries of the Netherlands Indies and British Malaya, likewise curtailed exports from these areas to others where American supplies might feel the competition.

The impact of the Pacific war on the United States will be more positive however, than in these relatively minor fields. The United States has been the outstanding factor in the gum copal trade from the Netherlands Indies, for example, with Great Britain likewise an important consuming center. Exports of gum copal to the United States had risen steadily for several years up to 1940, from 4,049 metric tons in 1938, to 7,150 in 1939, and in 1940, 8,108, with a continued rise noted for the past year.

Since this product grows wild in the Indies, except for some controlled cultivation on a few islands, and the trade is largely in the hands of Chinese middlemen and a few European brokers, it is easy to see what happens to this industry with several armies prowling and fighting back and forth in the main areas concerned, and also in view of interrupted shipping.

The United States also up to recently was taking about half of British India's shellac exports, with production averaging about 37,000 tons annually. Exports totaled, prior to war, about 22,500 tons annually, and of seed lac exports, ranging between 11,000 and 12,000 tons annually, the United States at one time absorbed about 90 per cent. Exports of button lac prior to war, amounted to slightly over 1,000 tons per year, with Great Britain taking half, and the United States half.

The United States produces a very considerable amount of creosote oil, but demand exceeds domestic supply to such an extent that in a recent year, imported oil accounted for 38 per cent of total consumption in this country. For various reasons imports have a less important role at the moment. However, while the United Kingdom supplied in 1940, over 80 per

cent of the United States' total imports, amounting to 39,000,000 gallons overall, it is significant that in the same year, Japan furnished 13 per cent of these total requirements.

Figures from Official Sources

It is worth mentioning in passing, that the figures quoted throughout this article have been gathered from various official sources, many through the Export-Import unit of the Department of Commer^e, and that such figures are no longer being made public for war reasons, hence may have some reference value. For this purpose it is added that 1941 incoming shipments of creosote, and the last figure made public, totaled 11,100,000 gallons.

Under war pressure adjustments are taking place automatically, it almost appears. Japan, because of war demands, has suppressed cultivation of pyrethrum flowers in favor of more rice, but British Kenya, in Africa, has continued as a prime source of such article for the United States; of 348 tons exported last July, the latest figure, 200 having been destined for the United States. In the previous month, 835 tons out of total exports of Kenya pyrethrum of 990 tons, were for American use.

Germany followed Japan in declaring war on this country thereby officially removing itself as a supplier to the United States of sodium chlorate, after being out of the market, of course, since the outbreak of European hostilities. France and Sweden shared with Germany as major sources for this commodity imported by the United States. Total imports were 3,759,200 pounds in 1939, and in 1940 were 1,835,500 pounds. By 1941 the sole importations totaled for the first 9 months only 2,600 pounds, which came from Canada.

For comparison the United States imported in 1929 and again in 1937, over 7,000,000 pounds, and in the last 16 years average annual imports have been 3,000,000 pounds. Regarded as probably the most effective general herbicide, adaptable to virtually all soils and climates, and used as an oxidizing agent in various industries such as textiles, colors, and certain chemical and metallurgical processes, the bulk of consumption of sodium chlorate in the United States is supplied by its own manufactures.

Its production has steadily increased in this country, although until recently the output was accounted for by one plant, located at Niagara Falls, N. Y. A plant has been completed recently at Portland, Ore., operation of which was scheduled to begin in December. The latter manufactory will supply a section of the country formerly dependent principally on imports.

Canada is one of the principal sources of the United States' sodium cyanide, used among other functions, for extraction of gold and silver from ore, as flotation agents for separating ores, fumigating citrus fruits and imports of cotton, grain elevators, in preparing liquid hydrocyanic acid, electroplating, heat treating metals, and in manufacture of several cyanides. The United States manufactures some, and even exports a small quantity. Imports for the first 9 months of 1941 were all from Canada, and came to 52,315,900 pounds.

Argols from South America

Argols, formerly imported in major quantities from wine-making areas of Europe, now is coming into the country in ever larger amounts from the Argentine and Uruguay; casein is being received likewise from Latin American sources. Thus Argentine chemical products during 1941 included casein, argols, tartar, wine lees, glycerine, medicinal products, with exceptionally large advances recorded for wine lees and argols, which with tartar, came to $1,495,000 in the first 8 months of 1941.

Nevertheless, Spain and Portugal, while bordering dangerously close to the war zone, have continued as important suppliers of wine lees and argols, the United States taking 4,734,000 pounds from Portugal in the first half of 1941, and for October of that year, 286,660 pounds from Spain, together with quantities of tartaric acid from the latter source.

Which raises the question of self-sufficiency. The United States wine and grape industry are entering this field, endeavoring to supply some of these things to native industry. As war restrictions grow not only is it expected that sources of supply for many articles and commodities normally imported, must be developed nearer home, but a whole list of synthetics and substitutes is probably about to emerge.

Road to Self-Sufficiency

In this respect the United States will be following such other war-ridden lands as England, and even Australia. England has been forced to develop certain domestic paints and substances required for their manufacture. Australia is reported to be making substantial progress to becoming temporarily at least, self-sufficient in essential drugs and medical supplies, made from home-grown substances that either are adaptable in place of former imports of the same genus, or from a widening field of synthetics. Nearer home Canada is reported to be using larger quantities of phenolic resins and alkyd resins from home sources, and to have expanded output of ingredients for use as paint thinners in place of toluene and other products now diverted to munitions.

Incidentally, as noted elsewhere in the issue, all toluene in the United States is now subject to allocation by the Division of Priorities of OPM, beginning the first of February; and directly incident to the threats to important sources of supply by the Pacific war, about 1800 fats and oils, excepting a group of others, have been put under rigid conservation measures, including regulation of distribution and use.

In recognition of the growing demand for industrial molasses the new Cuban trade agreement with the United States provides for a 50 per cent reduction in duties below those in the 1930 Tariff, applying to edible and industrial molasses, and liquid sugar. Based on average 1940 imports of the several varieties the new rates are equivalent to about 40 per cent ad valorem on edible molasses, 19 per cent for liquid sugar, and 2 per cent for industrial molasses.

This agreement coincided with the outbreak of the Pacific war which has rendered of doubtful availability, the Far East's sugar and its products, the same factors affecting the same sources for copra, palm oils, glycerine, and other products.

Further recognizing the dislocation of supplies by war and domestic needs, manufacturers of insecticides, germicides, and fungicides have, at the instance of the Department of Agriculture, been granted priority in obtaining scarce manufacturing materials, from whatever source.

Additional orders are anticipated to provide for price, supply, or distribution problems in many of the commodities involved in new war developments, as well as eventually, some concrete move to insure domestic development of supplies, but these are at present in general discussion.

Kenneth Tator Now With Office of Production Management

Kenneth Tator, well-known chemical engineering consultant of Egypt, Mass., and author of the regular monthly C. I. feature, "Between the Lines," has been called to Washington and is now with the Bureau of Conservation, Division of Substitution of the OPM. In his absence, the staff will continue this popular editorial feature.

Markets in Review

Heavy Chemicals — Fine Chemicals — Coal Tar Chemicals — Raw Materials — Agricultural Chemicals — Pigments and Solvents

By Paul B. Slawter, Jr., Market Editor

GREAT progress was made in the chemical industry during the year just past. Among the features were record outputs, record consumptions, record expansions and record building of new plants. It was also a record year for government control, or perhaps one should say, government cooperation.

The year ahead will probably be the greatest period of expansion in the American chemical industry; this is especially true if allotments of alloy steel and electric power are made available to the industry in large enough quantities.

The country needs more synthetic materials of all sorts—some to replace raw materials from which it has been cut off and some to fit new uses resulting from the demands of wartime production. All our war industries have increased the demand for chemicals of one type or another. What the needs will be before the war is over, no one can say. Along with the new explosives plants and the expansion of present production facilities the nation will see new ammonia, toluol, chlorine, and synthetic rubber plants.

Among the chemical shortages which will affect many civilian industries and many consumers will be soda ash, sulfuric acid, phenol, formaldehyde, phthalic anhydride, chloroform. There really is no limit to this list; these are just a few picked at random, indicative of the demands of such industries as aluminum, explosives, plastics.

War will dominate the economic scene. Many chemical companies already report the war program taking a major part of their capacity outputs. Research continues its increasingly important function in the war effort and each day represents another point closer to the goal of American self-sufficiency.

Government control really stepped into the limelight this month with sweeping and rigid restrictions all over the place. Tin, after March 31, is taboo for use in 29 items from advertising specialties to white metal according to a Conservation Order issued by Priorities Director Nelson. Tin cans and containers were not affected by the order. (except for orders already in force). Some 1,800 different kinds of fats and oils are affected by an order issued Dec. 30 by OPM prohibiting delivery of these products to manufacturers or processors in such quantity that would give more than a 90-day operating supply. This order expires Jan. 31. Oct. 1 market levels have been used as the "ceiling standard" for a revised schedule of these fats and oils. All toluene in the U. S. is subject to allocation beginning Feb. 1 in a General Preference Order which applies to stocks on hand as well as production after that date. No deliveries may be made after Feb. 1 without authorization from the Director of Priorities, and beginning with that date, at least 70% of the total production of all producers of toluene must be of nitration grade meeting Army grade A specifications. All types of synthetic rubber are subject to complete allocation in a revised order given out Jan. 2 by the Director of Priorities.

Important Price Changes

ADVANCED

	Nov. 30	Dec. 31
Acetone		
Tks.	$ .07	$ .08½
c. l.	.08½	.10
l. c. l.	.09	.10½
Alcohol*		
Ethyl, wine gal., bbls.	8.03	8.29½
dms.	7.99	8.25½
Grain, bbls.	8.28	8.39½
dms.	8.24	8.35½
Solv. gal., tks.	.28½	.54
Bleaching Powder, cwt.	2.00	2.25
Butyl alcohol, tks.	.12¼	.14½
Creosote Oil, gal.	.14½	.15½
Creosol, U.S.P.	.10¾	11.¾
Cresylic Acid, H. B., gal.	.81	.84
Divi divi, ton	48.00	52.00
Dried blood, unit	4.65	5.00
Japan Wax	.32	.35
Lactic Acid, U.S.P.	.50	.54
Tech 22% dk.	.02½	.0290
Nitrogenous, unit	2.50	2.75
Saltpeter, cwt., gran.	8.10	8.20
powd. & cryst.	9.10	9.20
Tankage, feeding unit	4.75	5.00
Superphosphate, ton, 16%	9.50	10.00
R. P.	9.00	9.60
Witchhazel, gal.	.40	.50

**Alcohol industry revised January shipment prices in a sharp upward direction. Schedules of manufacturers, however, seem to vary considerably. Chemical solvents, it was announced, are higher in keeping with mounting costs of production.*

On Dec. 23, Priorities Regulation No. 1, basic document which governs the operations of the priority system, was amended. Most important amendment is a requirement that *all* orders bearing a priority rating must be accepted by producers in preference to any unrated order. This includes B ratings for essential civilian orders as well as A ratings for defense orders. Previously the acceptance of B-rated orders was not mandatory. This seems to represent another step toward allocation of scarce materials.

Late in December, the government took control of all imports of 13 strategic materials—antimony, cadmium, chromium, copper, graphite, kyanite, lead, mercury, rutile, tungsten, vanadium, zinc and zircon.

All chlorine produced in the U. S. is subject to direct allocation after Feb. 1 under the terms of an amendment to General Preference Order M-19. Under this allocation, a new type of requirement is now provided for scheduling orders. Regardless of priority ratings, no producer of chlorine may accept orders after the 10th of any month for delivery in the next calendar month without specific direction from the Director of Priorities. Limits were removed on the amounts of methyl alcohol which may be delivered for use as a denaturant for ethyl or in the production of formaldehyde or for general chemical manufacture in another amendment. Purpose is to promote these uses for methyl at the expense of less essential uses. OPA allowed price ceiling increases on acetone, butanol and ethyl alcohol from corn in order to make for increased production. Also issued was price schedule No. 31 establishing a single ceiling of 6.93 cents a pound for acetic acid, f.o.b. in tank cars, whether wood or synthetic. OPM is planning the allocation of wood pulp based on the need for

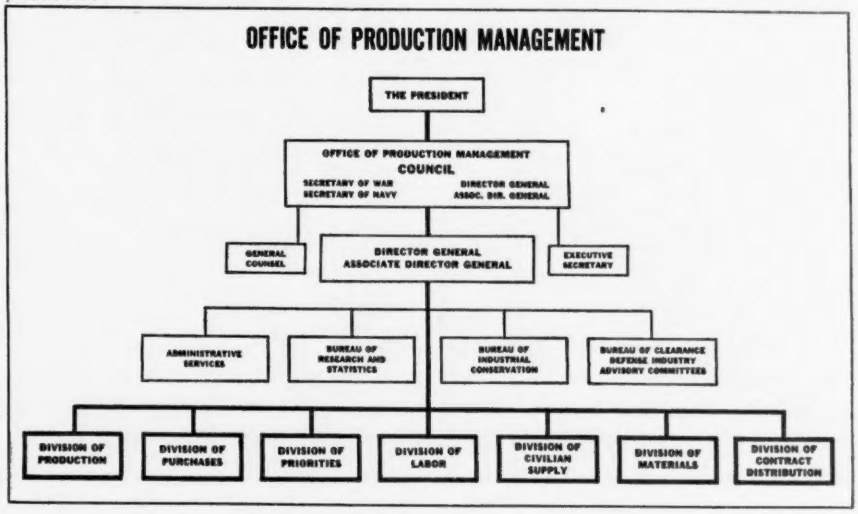


Chart shows setup of Office of Production Management.

the expanded use of the nitrating types in the production of ammunition. Sweeping restrictions on the use of lead were ordered Jan. 10 by OPM.

Heavy Chemicals: Prices of bleaching powder were stabilized by a series of individual agreements with producers and OPA. Maximum prices for 1942 delivery were set but more formal ceiling action is expected later. One of the largest producers of sulfuric acid has agreed to maintain prices throughout the first quarter of 1942. A tremendous increase in manufacture of glass containers is expected this year but it has been predicted that soda ash supplies may not meet the requirements of glass makers. Most chemicals are expected to go under specific export license after Jan. 20 except those for shipment to Canada, Great Britain, Newfoundland, Greenland and the Philippines. At this moment there is no specific news on what the policy will be for South America where a good part of the export demand has been coming from, but it is expected that trade will be heavy. Copper sulfate makers are shipping out material as fast as they can make it. Production is at peak capacity. Chlorine, nitrates and ammonia continue to go into manufacture of war materials at record rates. Calcium chloride manufacturers report ample supplies to meet domestic requirements. OPM is working on a plan to convert chlorine-making facilities of the pulp and paper industry to the manufacture of bleaching powder. Even though it is extremely difficult to get shipping space, every effort is being made to get materials out—especially to South America. Premiums for immediate shipment are being given for borax, copper sulfate, sodium silicate, tetrapyrophosphate, calcium chloride, calcium carbide and others. Makers of formaldehyde, paraformaldehyde and hexamethylenetetramine are making deliveries to consumers under general preference order.

A price ceiling, not yet confirmed as official, has been established on copper sulfate at $5.15 per cwt. on crystals and $9.20 per cwt. for monohydrated.

Price rises were noted in lactic acid, lead silicate, magnesite, African manganese dioxide and saltpeter, among others.

Fine Chemicals: Ethyl alcohol output from all distillers who have equipment which will manufacture 190 proof type from corn or grain must be their sole output after Jan. 15, OPM has ruled. The order affects 60% of the nation's distilling facilities and will cut the use of molasses from which the ethyl is made ordinarily. OPM also has forbidden the use of molasses for manufacture of beverage spirits after July 15, 1942, and the production of ethyl or butyl from molasses after Jan. 15 by any producer whose facilites for making these from grain are not being used at capacity. Insecticide, germicide and fungicide producers have been given priority ratings in obtaining materials. After July 1, 1942, all flour will have to be enriched (with riboflavin) according to FDA order. Synthetic menthol can replace the Japanese product. Quinine and all other cinchona preparations are way up in price. Tightening of control on ethyl and methyl alcohol will be felt in many branches of the fine chemical business. Among the products in tremendous demand are: bromides, iodides, sulfanilimide, procaine hydrochloride, citric acid, vitamins, glycerophosphates, saccharin and chloroform. Witchhazel manufacturers are having difficulties getting alcohol for their production. High prices and small supplies is the story in the codliver oil market. Some codliver oil is coming in from Iceland and Newfoundland, but not much. Mercury is still in the nominal price class.

Tartrates took it on the chin last month when Spanish ships decided not to make the American run any more. Some shipments of argols, wine lees and calcium tartrate were coming in from Spain but it's all over now. Argentine has been a source of supply for these products but is now a doubtful source.

Coal Tar Chemicals: Derivative producers are trying to take care of all requirements but, of course, preference is being given to military needs. There has been no definite announcement on intermediate prices but it is assumed that current quotations will last through the first quarter. There are no sizeable supplies available for exporters or for new customers. Shortages of basic materials are worrying dyestuff manufacturers. A government survey is under way on the situation in the dyestuff intermediate market. OPA's order stabilized prices for the first quarter on benzol, toluol, xylol and solvent naphtha. Anthraquinone will soon be scarce; manufacturers are having trouble getting phthalic anhydride and aluminum, two important materials in its manufacture. Quotations for coaltar colors remain the same, except for advances in orange G and metanil yellow.

Raw Materials: Our entrance into the war and the establishment of a Far Eastern theater has further complicated the raw materials situation. Coconut and palm oil will be scarcer and scarcer. There is talk of using babassu from Brazil but it will be a long time before sizeable quantities are available. Cracking is a problem. Venezuela has been suggested

HOW WE ARE SPENDING THE DEFENSE DOLLAR

Grant for OEM

Above chart showing the expenditure of defense appropriations is applicable only through the 30th of November. However, even though many additional appropriations must now be made, the chart shows the proportions of appropriations which are being used for the purposes listed.

as a source for palm nuts. Argentina grows half of the world's linseed-oil producing flaxseed. Shipments from that country to this should increase considerably. OPA has requested that prices be kept at the Dec. 18 levels on carnauba, beeswax, candelilla and uricury. War in the Far East also puts a jinx on our supply of cinchona bark, benzoin gum. The year opened with particularly bright prospects for gum and wood naval stores, both turpentine and rosin. Government turpentine and rosin stocks are practically depleted. Gum spirits turpentine will be in heavy demand. Great Britain will require tremendous supplies of our naval stores. South America is calling for supplies of rosins. Ships are scarce. Ceiling prices have been set on natural resins at prices prevailing Dec. 5 by OPA. Naval stores men are worrying about reports from Washington to the effect that "economists" there are working on price control for naval stores in common with other commodities. The industry fears that some of the "experts" know nothing of naval stores and hence would do more damage than good.

Fertilizer Materials: Because of heavy industrial requirements, fertilizer manufacturers are having a hard time getting sodium nitrate. Ammonium sulfate, sometimes used by them, is also scarce. Most Chilean sodium nitrate is being taken for industrial purposes in connection with the war program. Organic ammoniates are rising in price. Superphosphate prices were raised last month, a move which will send up mixed fertilizer prices in the spring. Outlook for agricultural chemicals is the best in years. Exceedingly heavy spring demand is expected and already is having its effect on ammonium sulfate, sodium nitrate and other potash salts. Deliveries of sodium nitrate are still subject to approval by OPM. Shipments for agricultural use are scarce.

Paint Materials: Titanium pigments will sell at the levels of Oct. 1, 1941, for the first quarter of 1942, OPA has announced. The agreement was carried out after one manufacturer who had proposed a one-cent increase withdrew his advance. Full priority control was imposed on the use and distribution of tung oil (chinawood) early this month by OPM in an effort to conserve supplies for war needs and for canning food products. A government office will purchase all existing supplies and all future imports of tung oil. A list of maximum prices for all grades of zinc oxides went into effect Jan. 1. Linseed oil price ceiling is not so nice for small paint and varnish makers. With no ceiling on flaxseed, price stays up. Paint men aren't getting much of the oil, and stocks of the smaller producers are small. A temporary price ceiling was put on natural resins and shellac this month, not to exceed the Dec. 5 level. A long range program is being worked out. Prices of most dry colors will not be raised above the Oct. 1 levels during the first quarter of 1942. Agreements have been made with OPA stabilizing these prices. Country's output of paint products reached a high record in 1941. Shortages of certain paint raw materials continue to be the chief concern of the industry, but the labor situation is pretty good. Full capacity has been noted in most plants, especially in those producing zinc oxide, lithopone and other paint raw materials. Priorities allocations and the container supply situation continue to inflict hardships. Carbon black prices went up (about 5%) the first of the year with zinc oxide. Glue producers are still allocating their orders with production running behind the demand. Raw materials are still scarce.

With Far Eastern paint materials cut off and restriction of domestic materials, voluntary measures are being taken by the paint industry to allocate and regulate distribution of supplies. This is helping the condition a great deal as it is in other industries. Many basic metals used in the manufacture of paints are under priority control and consumers are getting these materials on a pro rata basis.

Careful measures are being taken to guard against unwarranted consumption. Voluntary measures taken by the color industry has steadied dry and chemical color prices for the first quarter of the year, at least. Everything done so far by the paint industry has been to prevent inflationary advances in price and assure the war industries of essential supplies along with necessary civilian consumption.

engineering feat in winning metallic magnesium from sea water—F. W. Dennis, Hooker Electrochemical, chosen to head Chemical Section of the National Safety Council at annual meeting held in Chicago—Monsanto wins patent on melamine resins after an extended priority controversy in the Patent Office—Ethyl Gasoline to erect $2,500,000 hydrochloric acid plant at Baton Rouge thus freeing Ethyl's chlorine production for defense needs—Aluminum Co. of America resigns rights to "Alclad" trademark—Shortage of ammonia expected and government officials work on still further extension to construction program for ammonia plants—OPM sets up drastic allocation order on copper—Clarence W. Farrier is the new chief of the OPA chemical section—Duncan A. MacInnes, Rockefeller Institute named '42 recipient of the Nichols Medal—Louis Weisberg elected president, Association of Consulting Chemists and Chemical Engineers—Deaths: William A. Noyes, professor emeritus, University of Illinois.

SAGITTARIUS

November

OPM issues on Nov. 15 Limitation Order L-11 which materially lowers still further chlorine going to paper fields in effort to save an additional 60,000 tons annually—American Institute of Chemical Engineers at Virginia Beach meeting attracts 560, a record high—U. S. Phosphoric Products Division, Tennessee Corp., is constructing a new sulfuric acid plant at East Tampa—United States moves into Dutch Guiana to protect vital bauxite supplies—Shortages in chemicals becomes more and more acute as America moves closer to war—Secretary Ickes of the Department of Interior revives idea of developing a phosphate fertilizer program in the Northwest hoping for a new "TVA" in the Columbia River Valley—Sanderson & Porter to construct incendiary shell plant for CWS at Pine Bluff, Ark.—Ramsdell Matthews appointed assistant to Michigan Alkali's president; Bert Cremers is named director of sales, and J. H. Remick is the new manager of special products division—Chandler Medal to be awarded to two brothers, Dr. Robert R. Williams, chemical director of the Bell Telephone Laboratories and Prof. Roger J. Williams of the University of Texas—S. D. Kirkpatrick, Editor, "Chem. & Met.," elected president of the A.I.Ch.E.—Chemical industry starts move to standardize containers—OPM issues order allotting steel for drums—"Aralac" new casein fibre announced—Du Pont opens new cyanide products service laboratory—Same company opens its new nylon plant at Martinsville, Va.—International Agricultural changes name to International Minerals & Chemical-National Aniline & Chemical merged with parent company and henceforth will be known as a division of Allied Chemical & Dye—Deaths: Samuel H. Clark, president, Whitaker, Clark & Daniels; H. Gordon MacKelcan, vice-president in charge of sales, Innis, Speiden.

CAPRICORN

December

OPM announces distribution of toluene will be subject to specific allocation by director of priorities after Feb. 1, 1942—OPM takes over direction and distribution of fats and oils in order affecting more than 1,800 varieties—OPM completely revises priorities regulation No. 1 to require producers to accept all orders bearing a priority rating before taking any unrated business—Pinckney L. Frost appointed manager of sales for Innis-Speiden—Dr. Howard E. Fritz named director of research for B. F. Goodrich—Vick Chemical Co. takes over J. T. Baker Chemical Co.—Hoffmann Scholarship of Chemists' Club goes to Robert T. Olsen, M. I. T.—Department of Justice imposes fines on four corporations and five persons charged with conspiring with German and other European interests to restrict the importation and manufacture of medicinal hormones—Oscar Lind elected president of the Salesmen's Association of the American Chemical Industry—Thomas Nichols, vice-president of Prior Chemical Corp., appointed a "dollar-a-year-man" for OPM as consultant in inorganic chemical division.

Women Workers In Chemical Industry

The Satisfactory Experience of British Chemical Companies Is Reported—Digest from British *The Chemical Trade Journal*, Nov. 21, 1941

COPIES of a Memorandum entitled "War-time employment of women in chemical industry" have been forwarded by the Ministry of Supply (Chemical Control Board) to all firms scheduled in the Chemical Industry Labour Supply Scheme. The Memorandum has been prepared as a result of a special inquiry undertaken among members of the Association of British Chemical Manufacturers with the co-operation of I.C.I., Ltd., and has been approved by the representatives of the trade unions who formed part of the joint delegation which obtained the approval of the Ministry of Labour to the establishment of the Chemical Industry Labour Supply Scheme. In a letter accompanying the Memorandum, Mr. F. W. Bain, Chairman of the Chemical Control Board, says:

"There are increasing demands for labour in the chemical industry; 1,400 men are required immediately and a further 4,000 men will be wanted in the next three months. There are also vacancies for 8,400 women, during the period of which 4,800 will be in Scotland. The overall percentage of women employed is now about 23. Although women have supplied a large proportion of the additional labour required, there has been little real dilution by women in the positions occupied by men in peace-time. The industry will have to face a larger measure of dilution than has hitherto taken place, since men are less likely to be available from outside the industry to meet the demand for male labour."

The following abstracts are from the Memorandum itself:

Early in the war the view was that the employment of women in chemical works would necessarily be severely limited, but there is now a considerable volume of experience to show that women can do practically every job a man can do, apart from those requiring sheer physical strength. Most firms have either introduced women or extended their employment in jobs which are usually performed by women, e.g., filling, packing and labelling of small containers. Many firms, also, have employed women as assistants to process workers or as chemical labourers to liberate men for process and heavy work, and there are many jobs women have successfully undertaken which might not normally occur to managements or works managers. A list of examples of actual jobs in which women have replaced men successfully is given below. This list is based on reports of work actually done by women:

Jobs which Women are Doing

Light Work (with assistance where necessary in handling weights), such as—Charging furnaces with automatic weighing machines; charging batches of reasonable weight into vessels; operating filter presses, including emptying; filling drying trays and attending to drying ovens; loading, sieving, milling and small grinding machine work; digging out centrifuges; batch washing in closed vessels involving the manipulation of steam-water; crystallising and emptying crystallisers; taking of samples for analysis; routine chemical testing, laboratory and plant; assistants in plastic moulding and extrusion processes.

General Utility Work, such as—Weighing, packing, filling, labelling, stencilling and light trucking; warehousing and similar work not requiring too great physical effort; drum painting and lining in colours; washing and cleaning carboys, bottles and jars, barrels, solvent drums, dye tins, etc.; making drums and tin canisters; making wooden cases for export; machine cooperage work.

Light Labouring, such as—Light shovel work, provided that the throw is not above shoulder height; filling and handling carboys, barrels and drums (in one works up to 1 cwt.); weighing and loading from ground level (heavier weights with tackle); barrowing and wheeling small loads; driving small auto-trucks; handling monorail tanks on an overhead conveyor system in a fertiliser works; shunting in works and in quarry; dumper driving on tip.

Engineering and Maintenance Work, such as—Running down nuts and bolts in the engineer's shop; elementary drilling, screwing, scraping and milling; garage servicing and maintenance; as tradesmen's mates, e.g., to fitters, pipe fitters, plumbers, welders, electricians, tinsmiths, painters, bricklayers, carpenters; tool store and general stores assistants; painting buildings, boilers and plant on ground level; cleaning plant where it does not involve climbing; turning in an experimental shop.

Miscellaneous—Record keeping, including process charges and yields, stores and weighbridge; instrument assistants (chart changing, cleaning, etc.); time-keepers and time-takers; gate-keeper and inquiry office, traffic records, etc.

More detailed information on the many jobs in which women have been successfully employed is available on application to the Assistant Manager, A.B.C.M., 166, Piccadilly, London, W. 1, or the Secretary, Association of Chemical Employers, c/o Clayton Aniline Co., Ltd., Clayton, Manchester, 11.

Dealing with Heavy Work

Changes have only been necessary in the case of heavy jobs. Modification has usually taken the form of reducing the physical effort required, e.g., by reducing the sizes of packages, sacks, bags, blocks, containers, etc., to be lifted or handled, reducing the size of shovel, the load per barrow, etc., or providing lifting tackle. In jobs where heavy work, such as lifting, is an essential part of the job, it has been found possible by modification to substitute two women for one man, but a more usual ratio seems to be for three women to replace two men. In some works the heavy skilled work is done by men and the finishing by women. In other cases, the men give temporary assistance, e.g., in handling barrels and drums, etc., after filling. Supervision by an experienced man is a great help. Subject to proper safeguards, women have tackled really heavy work, especially in loading vehicles, trucks and machines.

Women have not been able to replace men in certain processes where there is heavy manual work, where neat, noxious gases or considerable discomfort is involved and/or where certain dangerous or toxic materials are handled. There are medical reasons why women should not be employed on work handling certain materials, such as pitch and coal tar. There are also Factories Act restrictions on the employment of women in certain processes, e.g., lead, nitro and amido processes.

Welfare Facilities

The main essentials in the way of special accommodation for women are separate lavatories and facilities for hanging and drying clothes. Some firms have provided separate wash rooms, changing rooms, rest rooms or canteens; others have set apart a separate part of the canteen for women.

One point to be specially stressed is the value of properly organised arrangements to introduce women workers, new to industrial life, to factory conditions, to explain their work in relation to the factory as a whole, safe methods of working and similar matters which help them to fit more easily into their job. An outline of a scheme adopted by one firm for this purpose is available on request

The employment of women on men's work is an important departure from the ordinary custom, and where the men employed are known to be connected with unions, works managements will be well advised to invite the fullest co-operation from the men's officials. There is much evidence that where the matter is intelligently tackled in such co-operation the results are more successful. It is desirable to inform the men through the Works Committee or the foremen, before women are introduced for the first time into a works. It should be made clear that the introduction of women is only a war-time measure to release men for other work in the industry.

Those firms which have appointed a special woman supervisor are enthusiastic about the results, especially if she is allowed to familiarise herself with the various jobs beforehand. In smaller works a forewoman can frequently be made the channel for any approach to the management and can usually deal with general welfare matters. In certain cases female charge hands for disciplinary purposes only have been appointed.

No difficulty is reported by the few

(*Continued on page 115*)

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.*

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 - Jan. 1941 $1.16 - Dec 1941 $1.01

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	...	.11
Acetaldol, 55 gal drs wks lb. wks ....lb.	.12	.13	.11	.13	.11	.25
Acetamide, tech, lcl, kgs lb.	.28	.30	.28	.30	.28	.50
Acetanilid, tech, 150 lb bbls lb.	.29	.31	.29	.31	.27	.31
Acetic Anhydride, drs, f.o.b. wks, frt all'd ....lb.	.11½	.13	.10½	.13	.10½	.11½
Acetin, tech, lcl, drs ......lb.	...	.29	.29	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd (*PC*) ....lb.	.08½	.158	.06	.158	.05	.06
drs, c-l, f.o.b. wks, frt all'd lb.	.10	.173	.07½	.173	.06½	.07½
Acetyl chloride, 100 lb cbys lb	.08½	.09½	.07½	.09½	.06½	.07½
Acetic, 28%, 400 lb bbls, c-l, wks (*PC*) .... 100 lbs.	3.18	3.43	2.23	3.43	...	2.23
glacial, bbls, c-l, wks 100 lbs.	8.30	8.55	7.62	8.55	...	7.62
glacial, USP bbls, c-l, wks .... 100 lbs.	11.00	12.50	10.25	12.50	...	10.25
Acetic Acid Glacial, *Synthetic*						
99.5%, cbys, cases, delv lb.	.0918	.10	.0843	.10	...	...
99.5%, 110-gal dr, delv lb.	.0845	.0870	.0843	.0918	...	...
USP XI, cases, cbys, delv ......lb.	.1025	.11	.1025	.11	...	...
USP XI, 110-gal drs, delv ......lb.	...	.10½	.10¼	.11	...	...
CP, cases, cbys, delv ...lb.	...	.14	.13½	.14	...	...
CP, 55-gal drs, delv ....lb.	.13½	.14¼	.13¼	.14¼	...	...
Acetylsalicylic, USP, 225 lb. bbls ......lb.	...	.45	...	.45	...	.45
Adipic, kgs, bbls ......lb.	...	.31	...	.31	.31	.72
Anthranilic, ref'd, bbls ...lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls ......lb.	...	.75	...	.75	...	.75
Ascorbic, bot ......oz.	1.85	2.10	1.85	2.10	2.25	3.00
Battery, cbys, wks ...100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs ......lb.	.54	.60	.54	.60	.54	.59
Boric, tech, gran, 80 tons, bulk-bgs, delv ......ton *a*	...	99.50	93.50	99.50	...	96.00
Broenner's, bbls ...... lb.	...	1.11	.	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl ......lb.	...	.23	...	.23	...	.23
tks, wks ......lb.	...	.21	...	.21	...	.21
Caproic, normal, drs ......lb.	.25	.30	.25	.35	.35	.40
Chicago, bbls ......lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs. wks ...... lb.	.03½	...	.03½	.05	.03½	.05
Chromic, 99¼%, drs (*FP*) lb.	.16¼	...	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. ......lb. *b*	.20	.21	.20	.21	.20	.21½
anhyd, gran bbls ......lb. *b*	...	.23	...	.23	...	.23
Cleve's, 250 lb bbls ......lb.	...	.65	...	.65	...	.57
Cresylic, 50%, 210-215° C.L., HB. drs, wks, frt equal gal.	.81	.84	.76	.84	...	...
50%, 204-206° C.L., LB, drs, wks, frt equal ..gal.	.81	.84	.76	.84	...	...
Crotonic, bbls, delv ... lb.	.26	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls ...... lb.	.27	.28	.24	.28	.24	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls ...... lb.	1.10	1.13	.90	1.13	.75	.93
USP, bbls ......lb.	1.27	...	1.10	1.27	.92	.95
H, 225 lb bbls, wks ......lb.		45	.	.45	...	.45
Hydriodic, USP 47% ....lb.	2.42	2.44	2.42	2.44	2.30	2.42
Hydrobromic, 34% conct 155 lb cbys, wks ......lb.	.35	...	.35	...	.35	.44
Hydrochloric, see muriatic						
Hydrofluoric, 30%, 400 lb bbls, wks ......lb.	.06	.06½	.06	.06½	.06	.06½
Hydrofluosilicic, 35%, 400 bbls, wks ......lb.	.09	.09½	.09	.09½	.09	.09½
Lactic, 22%, dark, 500 lb bbls ......lb.	.029	.0415	.02½	.0415	.02½	.03¾
22%, light ref'd, bbls lb.	.039	.0515	.03½	.0515	.03½	.04¾
44%, light, 500 lb bbls lb.	.073	.0855	.06½	.0855	.06½	.07¾
44%, dark, 500 lb bbls lb.	.063	.0755	.05½	.0755	.05½	.06¾
50%, water white, 500 lb bbls ......lb.	.12½	.13½	.10½	.13½	.10½	.11½
Lauric, drs ......lb.	.18¼	.18¾	.15	.18¾	.12	.14½
Laurent's, 250 lb bbls ... lb.	...	45	...	.45	.45	.46
Maleic, powd, kgs ...... lb.	...	.30	...	.30	.30	.40
Malic, powd, kgs ......lb.	...	.47	...	.47	...	.47
Mixed, tks, wks ......N unit	.05	.06	.05	.06	.05	.07¼
S unit	.0085	.009	.0085	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.15	.18
Monosulfonic, bbls ......lb.	...	1.50	...	1.50	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; *y* Price given is per gal.

(*FP*) Under full priority control. (*PC*) Under price ceiling.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Muriatic, 18°, 120 lb cbys, c-l, wks ......100 lb.	...	1.50	...	1.50	...	1.50
tks, wks ......100 lb.	...	1.05	...	1.05	1.00	1.05
20°, cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	...	1.75
tks, wks ......100 lb.	...	1.15	...	1.15	1.10	1.15
22°, c-l, cbys, wks ..100 lb.	...	2.25	...	2.25	.	2.25
tks, wks ......100 lb.	...	1.65	...	1.65	1.60	1.65
CP, cbys ......lb.	.06½	.08	.06½	.08	.06½	.08
N & W, 250 lb bbls ......lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	...	.10	...	nom.	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks ......100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv ......lb.	.11½	.13	.11½	.13	.11½	.13
Oxalic, 300 lb bbls, wks, or N Y ......lb.	.11¼	.14½	.10¾	.14½	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	.	.12	.12	.14
50%, acid, c-l, drs, wks lb.	...	.10½	.10½	.12	.06	.12
75%, acid, c-l, drs, wks lb.	.07	.0850	.07½	.0850	...	.07½
Picric, kgs, wks ......lb.	...	.35	...	.35	.35	.40
Propionic, 98% wks, drs lb.	...	.25	...	.25	...	.25
80% ......lb.	...	.14	...	.14	.14	.20
Pyrogallic, tech, lump, pwd, bbls ......lb.	...	1.45	1.20	1.45	1.05	1.20
cryst, USP ......lb.	...	2.10	1.70	2.25	1.55	2.25
Ricinoleic, bbls ......lb.	.32	.37	.32	.37	.27	.33
Salicylic, tech, 125 lb bbls, wks ......lb.	...	.33	...	.33	...	.33
USP, bbls ......lb.	.35	.38	.35	.40	.35	.40
Succinic, bbls ......lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	...	.17	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks ....100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ......ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks ....100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks ......lb.	.06½	.08	.06½	.08	.06½	.08
Fuming (Oleum) 20% tks, wks ...... ton	...	19.50	18.50	19.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.71	.73	.54	.73	.44	.56
Tartaric, USP, gran, powd, 300 lb bbls ......lb.	...	.70½	.46¼	.70½	.35¼	.46¼
Tobias, 250 lb bbls ......lb.	.55	.60	.55	.60	.55	.60
Trichloroacetic bottles ....lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs ...... lb.	...	1.75	...	1.75	.	1.75
Tungstic, pure, 100 lb pkg. lb.	...	2.86	no prices		no prices	
Albumen, light flake, 225 lb. bbls ......lb.	.65	.75	.55	.75	.55	.62
dark, bbls ......lb.	.13½	.15½	.13	.18	.13	.18
egg, edible ......lb.	1.80	1.85	.65	1.85	.53	.65
Alcohol, Amyl (from Pentane)						
tks, delv ...... lb.	...	.131	.111	.131	...	.111
c-l, drs, delv ......lb.	...	.141	.121	.141	...	.121
lcl, drs, delv ......lb.	...	.151	.131	.151	...	.131
Amyl, normal l-c-l drs Wyandotte, Mich. ......lb.	...	.27	.25	.27	...	.25
secondary, tks, delv lb.						
drs, c-l, delv E of Rockies ......lb.	...	.09½	...	.09½	...	.09½
tertiary, rfd, l-c-l, drs, f.o.b., Wyandotte, frt all'd ...... lb.	...	.09	...	.09	...	.09
Benzyl, cans ......lb.	.65	.75	.65	.75	.68	1.00
Butyl, normal, tks f.o.b. wks, frt all'd (*PC*) lb. *d*	.12½	.158	.09	.158	...	.09
c-l, drs, f.o.b. wks, frt all'd ......lb. *d*	.13½	.168	.10	.168	...	.10
Butyl, secondary, tks, delv ......lb. *d*	...	.08½	.07¼	.08½	...	.07¼
c-l, drs, delv ...... lb. *d*	...	.09½	.08¼	.09½	...	.08¼
Butyl, tert denat cl drs lb.	...	.12½	...	.12½	...	...
lcl drs ...... lb.	...	.13	...	.13	...	...
tks ...... lb.	...	.11½	...	.11½	...	...
Capryl, drs, crude, wks .lb.	...	.16	...	.16	...	...
Cinnamic, bottles . lb.	3.00	3.60	2.33	3.60	2.00	2.50
Denatured, CD 14, c-l drs, wks (*PC, FP*) .gal. *e*	...	.45½	.36½	.45½	.32½	.36½
tks, East, wks gal.	...	.58	.26½	.58	.25½	.26½
Western schedule, c-l, drs, wks ... gal. *e*	...	.43½	.40½	.43½	.34½	.37½
Denatured, SD, No. 1, tks,	...	.53	.28½	.53	.23½	.24½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher: *e* Anhydrous is 5c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Alcohols (continued):						
Diacetone, pure, c-l drs, delv lb. *f*	.11½	.13	.09½	.13	...	.12
tech, contract, drs, c-l, delv lb.	.11	.12	.09	.12	...	.11½
Ethyl, 190 proof, molasses, tks gal. *g*	...	8.12	5.96½	8.12	5.93½	5.94½
c-l, drs gal. *g*	...	8.19	6.02½	8.19	5.92½	6.00½
c-l, bbls gal. *g*	...	8.25	6.03½	8.25	6.00½	6.01½
Furfuryl, tech, 500 lb drs lb.	.20	.25	.20	.25	.25	.35
Hexyl, secondary tks, delv lb.	...	.23	.12	.23	...	.12
c-l, drs, delv lb.	...	.24	...	.13	...	.13
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv lb.	...	.22½	.22½	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.086	.079	.086	...	.079
c-l, drs lb.	...	.076	.069	.076	...	.069
tks lb.	...	.076	.069	.076	...	.069
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd lb.	...	.66½	...	.66½	...	.65
Ref'd 98%, drs, f.o.b. wks, frt all'd gal.	...	.65	...	.65	...	.65
Tech 91%, drs, above terms gal.	.35	.40	.35	.40	...	.33½
tks, same terms gal.	...	.30	...	.30	...	.28½
Tech 98%, drs, above terms gal.	...	.44	...	.44	.36	.37½
tks, above terms gal.	...	.37½	...	.37½	.31	.32½
Spec. Solvent, tks, wks gal.	...	.28	...	.28	.23½	.25½
Aldehyde ammonia, 100 gal drs lb.	.65	.70	.65	.70	.65	.82
Aldehyde Bisulfite, bbls, delv lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv lb.	.12	.15	.11	.15	.11	.12
Alphanaphthol, crude, 300 lb. bbls lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls lb.	...	.32	...	.32	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	...	4.25	3.75	4.25	...	3.75
delv NY, Phila 100 lb.	...	4.25	3.75	4.25	...	3.75
Granular, c-l, bbls wks 100 lb.	...	4.00	3.50	4.00	...	3.50
Powd, c-l, bbls, wks 100 lb.	...	4.40	3.90	4.40	...	3.90
Potash, lump, c-l, bbls, wks 100 lb.	...	4.50	4.00	4.50	...	4.00
Granular, c-l, bbls, wks 100 lb.	...	4.25	3.75	4.25	...	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.65	4.15	4.65	...	4.15
Soda, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Chrome, bbls 100 lb.	.12½	.15	no prices		6.50	6.75
Aluminum metal, c-l, (*FP*) 100 lb.	15.00	16.00	17.00	18.00	18.00	20.00
Acetate, 20%, bbls lb.	.08½	.09	.08	.09	.07½	.09
Basic powd, bbls, delv lb.	.40	.50	.35	.50	.35	.50
24% basic, bbls, delv lb.	.09½	.10	.09½	.12	...	...
Insoluble basic powder, bbls, delv lb.	.40	.50	.35	.50	...	...
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.08	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06½
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv lb.	.13	.15	.13	.15	...	.13
Hydrate, 96%, light, 90 lb. bbls, delv lb.	...	.14½	.12½	.14½	12½	.13½
heavy, bbls, wks lb.	...	.034	.029	.03½	.029	.03½
Oleate, drs lb.	.17½	.20	.17½	.20	.16¾	.20
Palmitate, bbls lb.	.25	.26	.20½	.26	.20½	.24½
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	...	.23	.18	.23	.19	.20
Sulfate, com, c-l, bgs, wks 100 lb.	1.15	1.25	1.15	1.25	...	1.15
c-l, bbls, wks 100 lb.	1.35	1.45	1.35	1.45	...	1.35
Sulfate, iron-free, c-l, bags, wks 100 lb.	1.75	1.85	1.60	1.85	1.60	1.80
c-l, bbls, wks 100 lb.	2.00	2.10	1.80	2.10	1.65	1.80
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	...	.05	.04½	.05	.04½	.05
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH_3 cont.	...	.05¼ z	.04	.05¼ z	.04	.05¼
Ammonium Acetate, kgs lb.	.27	.33	.27	.33	.27	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	.0564	.0614	.0564	.0614	...	.0564
Bifluoride, 300 lb bbls lb.	.15½	.18	.14	.18	.14½	.16½
Carbonate, tech, 500 lb bbls lb.	.08¼	.09¼	.08¼	.09¼	.08¼	.11
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	...	4.45	...	4.45	4.90
Gray, 250 lb bbls, wks 100 lb.	5.50	5.75	5.50	5.75	5.50	6.25
Lump, 500 lb cks spot lb.	no prices		no prices		no prices	
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls lb.	...	.12	...	.12	...	.12
Naphthenate, bbls lb.	...	.17	...	.17	...	.17
Nitrate, tech, bbls lb.	.0435	.0455	.0435	.0455	...	.0455
Oleate, drs lb.	...	.14	...	.14	...	.14
Oxalate, neut, cryst, powd, bbls lb.	.23	.29	.19	.29	.19	.25
Perchlorate, kgs lb.	.55	.65	.55	.65	no stocks	
Persulfate, 112 lb kgs lb.	.21	.23	.21	.22	.21	.22
Phosphate, diabasic tech, powd, 325 lb bbls lb.	.07¼	...	.07¼	.09¼	.07¼	.10
Ammonium (continued):						
Ricinoleate, bbls lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls lb.	...	.24½	...	.24½	...	.24½
Paste, bbls lb.	...	.06½	...	.06½	...	.06½
Sulfate, dom, f.o.b., bulk ton	29.00	30.00	29.00	30.00	...	29.00
Sulfocyanide, pure, kgs lb.	.45	.55	.45	.65	...	.65
Amyl Acetate (from pentane) tks, delv lb.	...	.145	.105	.145	...	.105
c-l, drs, delv lb.	...	.155	.115	.155	...	.115
lcl, drs, delv lb.	...	.165	.125	.165	...	.125
tech drs, delv lb.	...	.11½	.11½	.12	...	.12
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv lb.	...	.09½	...	.09½	...	.09½
tks, delv lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed l c l drs, wks lb.	...	.08	.0565	.08	.0535	.0665
tks, wks lb.	...	.06	.0465	.06	...	.0465
Amyl Ether (see Diamyl lcl, dms lb.	.102	...	...	...	...	...
cl, dms lb.	.095	...	...	...	...	...
tks lb.	.085	...	...	...	...	...
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.31	.25	.31	...	.25
Stearate, lcl, wks, drs lb.	...	.32½	.26	.335	...	.26
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Amylnaphthalenes, see Mixed Amylnaphthalenes						
Aniline Oil, 960 lb drs and tks lb.	...	.14½	...	.14½	...	.14½
Annatto fine lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80-85% lb.	...	.55	...	.55	...	.55
Anthraquinone, sublimed, 125 lb bbls lb.	...	.70	.65	.70	...	.65
Antimony metal slabs, ton lots lb.	.14	nom.	.14	.16½	...	.14
Butter of, see Chloride						
Chloride, soln, cbys lb.	...	.17	...	.17	...	.17
Needle, powd, bbls lb.	.16½	.18½	.16	.18	.16	.22
Oxide, 500 lb bbls lb.	.15	.16½	.12	.16½	.13	.15¾
Salt, 63% to 65%, drs lb.	...	.34	.28	.34	.28	nom.
Archil, conc, 600 lb bbls lb.	...	.26	no prices		no prices	
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls lb.	.10¼	.10¾	.09½	.10¾	.09	.10
Arsenic, Metal lb.	no prices		no prices		...	...
Red, 224 lb cs kgs lb.	no prices		no prices		.17½	.18
White, 112 lb kgs lb.	.04	.04¾	.03½	.04¾	.03	.04¼
Barium Carbonate precip, 200 lb bgs, wks ton	55.00	65.00	45.00	65.00	45.00	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ton	...	43.00	...	43.00	43.00	47.00
Chlorate, 112 lb kgs, NY lb.	...	.60	...	.45	.20	.45
Chloride, 600 lb bbls, delv, zone 1 ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	...	.10	...	.10	.10	.12
Hydrate, 500 lb bbls lb.	.06	.07	.05½	.07	.05½	.07
Nitrate, bbls lb.	.10½	.12½	.08½	.12½	.09½	.10½
Barytes, floated, 350 lb bbls c-l, wks ton	...	27.65	25.15	27.65	...	25.15
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ton	...	16.00	...	16.00	...	16.00
200 mesh ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks lb.	.45	.55	.45	.55	.55	.60
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.15	.14	.15	.14	.16
90% c-l, drs gal.	...	.20	.19	.20	.19	.21
Ind pure, tks, frt all'd gal.	...	.15	.14	.15	.14	.16
Benzidine Base, dry, 250 lb. bbls lb.	...	.70	...	.70	...	.70
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.23	.28
Benzyl Chloride, 95-97% rfd, drs lb.	.22	.24	.19	.24	.19	.21
Beta-Naphthol, 250 lb bbls, wks lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	...	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	...	.51	.52	.51	.52
Bismuth metal lb.	...	1.25	...	1.25	...	1.25
Chloride, boxes lb.	...	3.00	3.00	3.25	3.20	3.25
Hydroxide, boxes lb.	3.35	3.46	3.35	3.46	3.35	3.46
Oxychloride, boxes lb.	3.10	3.19	3.10	3.19	.	3.10
Subbenzoate, boxes lb.	...	3.40	...	3.40	3.25	3.36
Subcarbonate, kgs lb.	1.59	1.85	1.59	1.85	1.73	1.76
Subnitrate, fibre, drs lb.	1.29	1.57	1.20	1.57	1.48	1.51
Trioxide, powd, boxes lb.	...	3.65	...	3.65	3.56	3.57
Blanc Fixe, Pulp, 400 lb. bbls, wks ton *h*	40.00	46.50	35.00	46.50	50.00	80.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	2,25	3.10	2.00	3.10	...	2.85
lcl, drs, wks lb.	2.50	3.35	2.25	3.35	2.25	3.35
Blood, dried, f.o.b., NY unit	...	4.75	2.40	4.75	2.25	3.35
Chicago, high grade unit	...	5.00	2.50	5.00	2.00	3.50
Imported shipt unit	...	4.75	2.45	4.75	2.25	3.30
Blues, Bronze Chinese						
Prussian Soluble lb.	...	.36	.33	.36	.33	.37
Milori, bbls lb.	...	.36	.33	.36	.33	.34
Ultramarine,* dry, wks, bbls lb.	.	.11	.	.11	...	.11
Regular grade, group 1 lb.	.16	.27	.16	.20	...	.16
Pulp, Cobalt grade lb.	.22	.24	.22	.24	.22	.27
Bone, 4½ + 50% raw, Chicago ton	39.00	40.00	30.00	40.00	30.00	33.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	37.50	31.50	37.50	31.50	32.50
Domestic, bgs, Chicago ton	38.00	40.00	32.00	40.00	29.00	32.00

f Prices are 1c higher in each case.
g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
z On a f.o.b. wks. basis.

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

Prices Current

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Borax, tech, gran, 80 ton lots, sacks, delv ton *j*	...	45.00	43.00	45.00	...	43.00
bbls, delv ton *j*	...	56.00	53.00	56.00	...	53.00
Tech, powd, 80 ton lots, sacks ton	...	50.00	48.00	50.00	47.00	48.00
bbls, delv ton	...	61.00	58.00	61.00	57.00	58.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.25	.30	.25	.30	.25	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	...	.57
Gold, blk lb.	.60	.65	.60	.65	.60	.65
Butanes, com 16-32° group 3 tks lb.	.02½	...	.02½	.03	.02¼	.03¾
Butyl, acetate, norm drs, frt all'd lb.	.14½	.168	.10	.168	...	.10
tks, frt all'd lb	.13½	.158	.09	.158	...	.09
Secondary, tks, frt all'd lb.	...	.08½	.07¼	.08½	...	.08
drs, frt all'd lb.	...	.09½	.08¾	.09½	.07½	.08
Aldehyde, 50 gal drs, wks lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Chloride, normal lcl, dms lb.	.28	...	...	...	...	...
cl, dms lb.	.25	...	...	...	...	...
Crotonate, norm, 55 and 110 gal drs, delv lb.	...	.35	...	.35	...	.35
Lactate lb.	...	.23½	...	.23½	.23½	.24½
Oleate, drs, frt all'd lb.	...	.25	...	.25	...	.25
Propionate, drs lb.	.16½	.17	.16½	.17	.16½	.17
tks, delv lb.	...	.15½	...	.15½	...	.15½
Stearate, 50 gal drs lb.	...	.32½	.28½	.32½	...	.28½
Tartrate, drs lb.	no prices		.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal lb.	.90	nom.	.80	.95	.80	.85
Sulfide, orange, boxes lb.	...	1.10	...	1.10	.75	.85
Calcium, Acetate, 150 lb bgs c-l, delv 100 lb.	3.00	4.00	1.90	4.00	...	1.90
Arsenate, c-l, E of Rockies, dealers, drs lb.	.06½	.07½	.06	.07½	.06	.07¼
Carbide, drs lb.	...	.04¾	...	.04¾	.05	.06
Carbonate, tech, 100 lb bgs, c-l ton	16.00	20.00	16.00	20.00	...	...
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv ton	...	20.50	...	20.50	...	22.00
paper bags, c-l, delv ton	18.50	35.00	18.50	35.00	20.50	36.00
Solid, 650 lb drs, c-l, delv ton	18.00	34.50	18.00	34.50	19.00	35.00
Ferrocyanide, 350 lb bbls wks lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls lb.	.52	.59	.52	.59	.50	.57
Levulinate, less than 25 bbl lots, wks lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ton	no prices		no prices		28.00	29.00
Palmitate, bbls lb.	.28	.29	.22	.29	.22	.24
Phosphate, tribasic, tech, 450 lb bbls lb.	.0635	.0705	.0635	.0705	.0635	.07½
Resinate, precip, bbls lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls lb.	.26	.27	.20½	.27	.20½	.22½
Camphor, slabs lb.	1.60	1.65	.73	1.65	.82	.84
Powder lb.	1.60	1.65	.63	1.65	.82	.84
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, f.o.b. plants lb.	...	.03425	.03325	.03425	.02¾	.03¾
lcl, bgs, f.o.b. whse lb.	...	.075	.07025	.075	...	.06525
Decolorizing, drs, c-l lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (FP), 55 or 110 gal drs, c-l, delv lb.	...	.73	.66½	.73	...	.66½
Casein, Standard, Dom, grd lb.	...	.31	.11½	.31	.10	.14½
80-100 mesh, c-l bgs lb.	...	.31½	.12	.31½	.11	.15
Castor Pomace, 5½ NH_3, c-l, bgs, wks ton	15.50	16.00	15.00	16.00	15.00	17.50
Imported, ship, bgs ton	no prices		no prices		...	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, frt all'd, 50 lb kgs lb.	...	.30	...	.30	.30	.34
Triacetate, flake, frt all'd lb.	...	.30	...	.30	...	...
Chalk, dropped, 175 lb bbls lb.	...	.02⅞	.02¾	.02⅞	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	...	.03¼	.02¾	.03¼
Light, 250 lb cks lb.	...	.03¼	...	.03¼	.03¼	.04
Charcoal, Hardwood, lump, blk, wks bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ton	25.00	36.00	25.00	36.00	25.00	36.00
Willow, powd, 100 lb bbls, wks lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb.	...	.0275	.01¾	.0275	...	.01¾
25%, bbls, wks lb.	...	.0275	.0240	.0275	...	.02½
China Clay, c-l, blk mines ton	...	7.60	...	7.60	7.60	9.50
Imported, lump, blk ton	18.60	23.00	18.60	...	25.00	26.00
Chlorine, cyls, lcl, wks, contract (FP) lb.	...	.07¼	...	.07¼	.07½	.08½
cyls, c-l, contract lb *j*	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	2.00	1.75	2.00	...	1.75
Multi, c-l, cyls, wks, cont lb.	...	.235	.019	.235	...	.019
Chloroacetophenone, tins, wks lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb, drs, lcl, wks lb.	...	.08	.06	.08	.06	.08
Chloroform, tech, 1000 lb drs lb.	...	.20	...	.20	.20	.21
USP, 25 lb tins lb.	...	.30	...	.30	.30	.31
Chloropicrin, comml cyls lb.	...	.80	...	.80	...	.80
Chrome, Green, CP lb.	.21	.25	.21	.25	.21	.25
Yellow lb.	...	.14½	.13½	.14½	.13½	.14½
Chromium Acetate, 8% Chrome, bbls lb.	.07¾	.08½	.07¾	.08½	...	.05¾

j A delivered price; * Depends upon point of delivery.
(FP) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Chromium (continued) Fluoride, powd, 400 lb bbl lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls bbl.	7.50	7.75	7.50	7.75	7.50	8.00
Cobalt Acetate, bbls lb.	...	.83¾	.80½	.83¾	...	.80½
Carbonate tech, bbls lb.	...	1.58	...	1.58	1.38	1.60
Hydrate, bbls lb.	...	2.04	1.98	2.04	...	1.78
Linoleate, solid, bbls lb.	...	.42	.33	.42	...	.33
paste, 6%, drs lb.	...	.31	...	.31	...	.31
Oxide, black, bgs lb.	...	1.84	...	1.84	...	1.84
Resinate, fused, bbls lb.	...	.13½	...	.13½	...	.13½
Precipitated, bbls lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.37	.38
Teneriffe silver, bgs lb.	.38	.39	.38	.39	.38	.39
Copper, metal *FP, PC* 100 lb.	12.00	12.50	12.00	12.50	11.00	12.00
Acetate, normal, bbls, dlvd lb.	.24	.26	.22	.26	.22	.24
Carbonate, 52-54% 400 lb bbls lb.	.18	.20½	.1650	.20½	.1570	.169
Chloride, 250 lb bbls lb.	...	.19½	.16	.19½	.16	.18
Cyanide, 100 lb drs lb.	.34	.38	.34	.38	...	.34
Oleate, precip, bbls lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	.19½	.21	.18	.21	.18	.18¾
red 100 lb bbls lb.	.20	.22	.19	.22	.19½	.20½
Sub-acetate verdigris, 400 lb bbls lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks, 100 lb.	5.15	5.50	4.75	5.50	4.45	4.75
Copperas crys and sugar bulk c-l, wks ton	...	17.00	14.00	17.00	14.00	20.00
Corn Sugar, tanners, bbls 100 lb.	...	4.05	3.36	4.05	2.99	3.39
Corn Syrup, 42°, bbls 100 lb.	...	3.52	3.42	3.52	3.02	3.47
43°, bbls 100 lb.	...	3.57	3.47	3.57	3.07	3.52
Cotton, Soluble, wet 100 lb. bbls lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls lb.	...	.57½	.38¼	.57½	.28¼	.38¼
Creosote, USP 42 lb cbys lb.	.60	.77	.45	.77	.45	.47
Oil, Grade 1 tks gal.	...	.15½	.13½	.15½	.13½	.14
Grade 2 gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs, c-l lb.	.11	.11¼	.09¾	.11¼	.09¾	.10¼
Crotonaldehyde, 97%, 55 and 110 gal drs, wks lb.	...	.15	.11	.15	.11	.12
Cutch, Philippine, 100 lb. bale lb.	...	.05¼	.04¾	.05¼	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	no prices		...	1.40	...	1.40
Derris root 5% rotenone, bbls lb.	.38	.40	.21	.40	.21	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago 100 lb.	...	4.00	3.80	4.00	3.40	3.80
British Gum, bgs 100 lb.	...	4.25	4.05	4.25	3.65	4.10
Potato, Yellow, 220 lb bgs lb.	...	.08½	.08	.08½	...	.07¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08½	.09
Tapioca, 200 bgs, lcl lb.	...	.0715	...	.0715	...	.0715
White, 140 lb. bgs 100 lb.	...	3.95	3.75	3.95	3.35	3.75
Diamylamine, c-l, drs, wks lb.	...	.50	.47	.50	...	.47
lcl drs, wks lb.	...	.53	.48	.53	...	.50
Diamylene, drs, wks lb.	...	.105	.095	.105	.095	.102
lcl, dms	.112	...	...	...	...	...
tks, wks lb.	...	.09½	.08½	.09½	...	.08½
Diamylether lb.	...	...	.085	.102	.085	.092
lcl, dms lb.	.102	...	...	...	...	...
cl, dms lb.	.095	...	...	...	...	...
tks lb.	.085	...	...	...	...	...
Diamylnaphthalene, l-c-l, drs, f.o.b. wks lb.	...	.17	.17	.20	...	...
Diamylphenol, lcl, dms lb.	.21	...	...	...	...	...
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.21	.21½
Diamyl Sulfide, drs, lcl lb.	...	.25	...	...	...	...
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.53	...	.53	...	.53
c-l drs, wks lb.	...	.50	...	.50	...	.50
tks, wks lb.	...	.48	...	.48	...	.48
Dibutyl Ether, drs, wks, lcl lb.	.26	.28	.25	.28	...	.25
Dibutylphthalate, drs, wks, frt all'd lb.	.19	.20	.19	.20	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.87	.50	.87	...	.50
Dichlorethylene, drs lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks lb.	.15	.16	.15	.16	.15	.16
tks, wks lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, cl, dms lb.	...	.037	.025	.04	...	.025
lcl, dms lb.	.045	...	...	...	...	...
tks, wks lb.	...	.03	.0221	.025	...	.0221
Diethanolamine, tks, wks lb.	...	.22½	...	.22½	...	.22½
Diethylamine, 300 lb drs, lcl, f.o.b., wks lb.	...	.70	...	.70	...	.70
Diethylamino Ethanol, l-c-l, drs, f.o.b. Wyandotte, frt all'd E. Miss. lb.	...	.75	...	.75	...	...
Diethylaniline, 850 lb drs lb.	...	.40	...	.40	.40	.52
Diethylcarbonate, com drs lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, c-l, drs lb.	...	.20	.19	.20	.19	.19½
Diethylsulfate, tech, drs, wks, lcl lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs lb.	.14	.15½	.14	.15½	.14½	.15½
Mono ethyl ether, drs lb.	.14½	.15½	.14½	.15½	.14½	.16
tks, wks lb.	...	.13½	...	.13½	...	.13½
Mono butyl ether, drs lb.	.22½	.24½	.22½	.24½	.22½	.24½
tks, wks lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls lb.	...	.16	...	.16	.16	.21
Oleate, bbls lb.	...	.17	...	.17	.13	.17
Stearate, bbls lb.	...	.22	...	.22	.22	.26
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis lb.	.85	.90	.85	1.05	1.00	1.05
Dimethylaniline, 240 lb drs lb.	.23	.24	.23	.24	.23	.24

* These prices were on a delivered basis.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Dimethyl phthalate, drs, wks, frt all'd ...... lb.	...	.20	.18½	.20	...	.18½
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb.	...	.18	...	.18	.18	.19
Dinitrochlorobenzene, 400 lb bbls ...... lb.	...	.14	...	.14	...	.14
Dinitronaphthalene, 350 lb bbls ...... lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	...	.22	.22	.23
Dinitrotoluene, 300 lb bbls lb.	...	.18	.15½	.18	...	.15½
Diphenyl, bbls ...... lb.	.15	...	.15	.20	.15	.20
Diphenylamine ...... lb.	...	.25	...	.25	.25	.32
Diphenylguanidine, 100 lb drs ...... lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	...	52.00	32.00	52.00	...	nom.
Extract ...... lb.	.05¾	06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).						
Egg Yolk, dom., 200 lb. cases lb.	1.00	1.05	.60	1.05	.57	.62
Epsom Salt, tech, 300 lb bbls c-l, NY ..... 100 lb.	...	1.90	...	1.90	1.90	2.10
USP, c-l, bbls ..... 100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs ...... lb.	.52	.53	.26	.53	...	.26
Isopropyl 50 gal drs ... lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd ...... lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ... lb.	...	.73	...	.73	...	.68
Synthetic, wks, tks ..... lb.	...	.08	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd ...... lb.	.11	.12	.06½	.12	.06	.06½
drs, frt all'd ...... lb.	.12	.13	.07½	.13	.07	.08½
99%, tks, frt all'd ... lb.	...	.12¼	.06¾	.12¼	.06¼	.08
drs, frt all'd ...... lb.	...	.13¼	.07¾	.13¼	.07¼	.08¾
Acetoacetate, 110 gal drs lb.	...	.37½	.27½	.37½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs ..... lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd ...... lb.	.45	...	.45	.50	.45	.50
Chloride, 200 lb drs .... lb.	.18	.20	.18	.20	.18	.20
Chlorocarbonate, cbys .. lb.	...	.30	...	.30	...	.30
Crotonate, drs ...... lb.	...	.35	...	.35	...	.35
Formate, drs, frt all'd .. lb.	...	.27¾	.25	.27¾	.23	.24
Lactate, drs, wks ...... lb.	...	.33½		.33½	...	.33½
Oxalate, drs, wks ...... lb.	...	.33	.25	.33	...	.25
Oxybutyrate, 50 gal drs, wks ...... lb.	1.00	nom.	1.00	nom.	.30	1.00
Silicate, drs, wks ...... lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ...... lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .... lb.	.75	.85	.75	.85	.75	.85
Anhydrous ...... lb.	...	.75	...	.75	..	.75
Dichloride, (*FP*) 50 gal drs, E. Rockies ...... lb.	...	.0742	.0693	.0746	.0595	.0694
Glycol, 50 gal drs, wks. lb.	.14½	.18½	.14½	.18½	.14½	.18½
tks, wks ...... lb.	...	.13½	...	.13½	...	.13½
Mono Butyl Ether, drs, wks ...... lb.	.16½	.17½	.16½	.17½	.16½	.21
tks, wks ...... lb.	...	.15½	...	.15½	...	.15½
Mono Ethyl Ether, drs wks ...... lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks ...... lb.	...	.13½	...	.13½	...	.13½
Mono Ethyl Ether Acetate, drs, wks ..... lb.	.11½	.12½	.11½	.12½	.11½	.13
tks, wks ...... lb.	...	.10½	...	.10½	...	.10½
Mono Methyl Ether, drs wks ...... lb.	.15½	.16½	.15½	.16½	.15½	.17
tks, wks ...... lb.	...	.14½	...	.14½	...	.14½
Oxide, cyl ...... lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline ...... lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery .... ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks ...... ton	14.00	17.50	14.00	17.50	14.00	17.50
Ferric Chloride, tech, crys, 475 lb bbls ...... lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ...... lb.	.06½	.07	.06½	.07	.06¼	.07
Fish Scrap, dried, unground wks ...... unit *l*	...	4.85	4.35	4.85	3.10	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ...... unit *m*	...	3.25	2.75	3.25	2.25	3.50
Fluorspar, 98% bgs .... ton	32.00	34.00	29.00	34.00	29.00	32.00
Formaldehyde, c-l, bbls, wks (*FP, PC*) ...... lb.	.055	.0575	...	...	...	...
Fossil Flour ...... lb.	.02½	.04	.02½	.04¼	.02½	.04
Fullers Earth, blk, mines ton	8.50	15.00	8.50	15.00	...	15.00
Imp powd, c-l, bgs .... ton	30.00	40.00	no prices		...	25.00
Furfural (tech) drs, wks lb.	...	.15	.10	.15	.10	.15
tks, wks ...... lb.	...	.09	...	.09	...	...
Furfuramide (tech) 100 lb drs ...... lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.18	.18½	.16	.19½	.16	.17¼
Fustic, crystals, 100 lb boxes ...... lb.	.28	.32	.24	.32	.24	.28
Liquid 50°, 600 lb bbls lb.	.12½	.16	.10½	.16	.10½	.14
Solid, 50 lb boxes ..... lb.	.19	.21	.19	.21	.19	.21
G Salt paste, 360 lb bbls.. lb.	...	.45	...	.45	.45	.47
Gambier, com 200 lb bgs.. lb.	...	.09½	.06½	.09½	.06½	.07
Singapore cubes, 150 lb bgs ...... 100 lb.	.09½	.10	.08¼	.11	.08¼	.10
Glauber's Salt, tech, c-l, bgs, wks* ...... 100 lb.	1.05	1.28	.95	1.28	.95	1.18
Anhydrous, see Sodium Sulfate						
Glue, bone, com grades, c-l bgs ...... lb.	.15½	.18½	.13½	.18½	.13½	.15½
Better grades, c-l, bgs lb.	.19	.30	.15	.30	.15	.23

l + 10; *m* + 50; * Bbls. are 20c higher.
FP Full Priority. *PC* Price Ceiling.

Current

Glycerin, CP
Hydrogen Peroxide

		Current Market		1941 Low	1941 High	1940 Low	1940 High
Glycerin (*PC*) CP, drs	lb.	...	.18¼	.14½	.19½	...	.12½
Dynamite, 100 lb drs	lb.	...	.18¼	...	.18¼	...	nom.
Saponification, drs	lb.	...	.13¾	.09½	.20½	.09½	.13
Soap Lye, drs	lb.	...	.11½	.07⅛	.18	.07⅛	.08¼
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	.27
Monostearate, bbls	lb.	...	.30	...	.30	...	.30
Oleate, bbls	lb.	...	.22	...	.22	...	.22
Phthalate	lb.	...	.38	...	.38	.37	.38
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.22	...	.22	...	.22
Phthalate, drs	lb.	...	.38	...	.38	...	.38
Stearate, drs	lb.	...	.26	...	.26	...	.26
GUMS							
Gum Aloes, Barbadoes	lb.	.80	.85	.80	.95	.80	.90
Arabic, amber sorts	lb.	.18	.20	.14	.25	.08½	.15
White sorts, No. 1, bgs	lb.	.33	.35	.35	.45	.28	.36
No. 2, bgs	lb.	no prices		no prices		.27	.34
Powd, bbls	lb.	.22	.24	.18	.30	.12½	.20
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY	lb.	.04½	.05½	04½	.05½	.02½	.10½
California, f.o.b. NY, drs	ton	20.00	36.50	20.00	36.50	29.00	36.50
Egyptian, 200 lb cases, f.o.b. NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.45	.50	.19	.50	.17	.24
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.49½	...	.49½	...	.49½
Dark amber	lb.	...	.12¾	...	.12¾	.11⅜	.12⅜
Light amber	lb.	...	.17	...	.17	...	.17
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.17⅜	.12¾	.17⅜	.12¾	.15⅝
Chips	lb.	...	.11½	.06¾	.11½	.06¾	.09
Dust	lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs	lb.	...	.13⅜	.10½	.13⅜	.10½	.14⅜
Singapore, Bold	lb.	...	.22⅜	.15¾	.22⅜	.14⅝	.17½
Chips	lb.	...	.12⅜	.08½	.12⅜	.08½	.09⅛
Dust	lb.	...	.07	.05¼	.07	.04¾	.06¾
Nubs	lb.	...	.17¾	.11	.17¾	.11	.13½
Copal Manila, 180-190 lb		...	.14	.13⅞	.14	.13¾	.16¾
Loba B	lb.	...	.14¼	.11¾	.14¼	.11¾	.16⅛
Loba C	lb.	...	.13⅞	.11¼	.13⅞	.11¼	.14½
DBB	lb.	...	.12¼	.10	.12¼	.06⅞	.12¼
MA sorts	lb.	...	.10¼	.07¾	.10¼	.07¾	.13¾
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.22⅞	.15⅜	.22⅞	.15⅛	.18½
Chips	lb.	...	.14½	.10	.14½	.08⅜	.10½
Mixed	lb.	...	.17⅞	.14⅜	.17⅞	.14⅛	.16⅝
Nubs	lb.	...	.18⅞	.12¾	.18⅞	.10¾	.13½
Split	lb.	...	.19⅝	.13¾	.19⅝	.13½	.16⅛
Damar Batavia, 136 lb cases							
A	lb.	...	.35¾	.21⅝	.35¾	.21⅝	.22¾
B	lb.	...	.34⅜	.20¼	.34⅜	.20⅛	.21⅛
C	lb.	...	.28⅝	.14⅝	.28⅝	.15⅝	.15¼
D	lb.	...	.25⅝	.13¼	.25⅝	.13¼	.13¼
A/D	lb.	...	.28⅜	.15¼	.28⅜	.13⅞	.14½
A/E	lb.	...	.25⅝	.12⅞	.25⅝	.12⅞	.13⅜
E	lb.	...	.18¾	.10	.18¾	.10	.10⅜
F	lb.	...	.13¾	.08	.13¾	.08	.08¾
Singapore, No. 1	lb.	...	.30⅝	.16⅝	.30⅝	.16⅝	.19⅝
No. 2	lb.	...	.25⅜	.12¼	.25⅜	.12¼	.15¾
No. 3	lb.	...	.12⅜	.07⅛	.12⅜	.07⅛	.09
Chips	lb.	...	.23½	.11	.23½	.11	.12½
Dust	lb.	...	.13	.07⅛	.13	.07⅛	.09
Seeds	lb.	...	.17¾	.09⅞	.17¾	.09⅞	.10½
Elemi, cns, c-l	lb.	...	.08⅞	.08½	.08⅞	.10⅛	.11⅝
Ester	lb.	.08½	.09½	.06¼	.09½	.06¼	.06¾
Gamboge, pipe, cases	lb.	.95	1.00	.95	1.00	.70	.75
Powd, bbls	lb.	1.05	1.10	1.05	1.10	.75	.80
Ghatti, sol, bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs	lb.	.14	.33	.14	.33	.14	.33
Kauri, NY							
Brown XXX, cases	lb.	...	.60	...	.60	...	.60
BX	lb.	...	.38	...	.38	...	.38
B1	lb.	...	.28	...	.28	...	.28
B2	lb.	...	.24	...	.24	...	.24
B3	lb.	...	.18½	...	.18½	...	.18½
Pale XXX	lb.	...	.61	...	.61	...	.61
No. 1	lb.	...	.41	...	.41	...	.41
No. 2	lb.	...	.24	...	.24	...	.24
No. 3	lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins	lb.	no stocks		no prices		2.00	4.50
Mastic	lb.	3.25	3.30	1.50	3.30	.85	2.50
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	1.00	1.10	.50	1.10	.35	.37
Senegal, picked bags	lb.	...	.30	...	.30	...	.30
Sorts	lb.	...	.13	...	.13	...	.13
Thus, bbls	280 lbs.	...	16.50	15.00	16.50	15.00	15.25
Tragacanth, No. 1, cases	lb.	3.25	3.40	2.75	3.40	2.65	3.50
No. 2	lb.	2.70	2.80	2.45	2.80	2.55	3.35
No. 3	lb.	1.10	1.20	1.10	2.60	2.45	2.90
Yacca, bgs	lb.	.06½	.07¾	.03½	.07¾	.03½	.04
Hematine crystals, 400 lb bbls	lb.	.24	.34	.20	.34	.20	.30
Hemlock, 25%, 600 lb bbls. wks	lb.	nom.	.03½	.03⅛	.03½	.03⅛	.03⅜
tks	lb.	nom.	.03	.02¾	.03	.02¾	.03
Hexalene, 50 gal drs, wks	lb.	...	.23	.23	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks	gal.	...	.11	.09¾	.11	...	.10½
Hexamethylenetetramine, powd, drs (*FP*)	lb.	.32	.33	.32	.33	.32	.33
Hexyl Acetate, secondary, delv, drs	lb.	.13	.13½	.13	.13½	.13	.13½
tks	lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago	unit	3.00	3.05	2.65	3.05	2.00	3.15
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.16	.18½	.16	.18½	.16½	.20

(*FP*) Full Priority. (*PC*) Price Control.

**Hydroxylamine Hydrochloride
Methanol**

Prices

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Hydroxylamine Hydro-chloride ... lb.	...	3.15	...	3.15	...	3.15
Hypernic, Bags, No. 1 ... lb.	...	.42	.40	.42	...	...
Indigo, Bengal, bbls ... lb.	2.14	2.20	1.63	2.20	1.63	1.67
Synthetic, liquid ... lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars ... lb.	...	2.00	...	2.00	1.75	2.50
Irish Moss, ord, bales ... lb.	.30	.31	.25	.31	.15	.28
Bleached, prime, bales ... lb.	.45	.46	.32	.46	.28	.35
Iron Acetate Liq. 17°, bbls delv ... lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls ... 100 lb.	3.50	4.00	3.50	4.00	2.75	4.00
Isobutyl Carbinol (128-132° C)						
drs, frt all'd ... lb.	...	.23½	.22½	.23½	.22½	.34
tks, frt all'd ... lb.	...	.21½	...	.21½	.21½	.32
Isopropyl Acetate, tks, frt all'd ... lb.	...	.07½	.06½	.07½	.05½	.06½
drs, frt all'd, c-l ... lb.	...	.08½	.07½	.08½	.06½	.07½
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ... ton	22.00	25.00	22.00	25.00	22.00	35.00
Lead Acetate, f.o.b. NY, bbls,						
White, broken ... lb.	.12	.12½	.11	.12½	...	.11
cryst, bbls ... lb.	.12	.12½	.11	.12½	...	.11
gran bbls ... lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
powd, bbls ... lb.	.12¾	.13¼	.11¾	.13¼	...	.11¾
Arsenate, East, drs ... lb.	.09	.11	.09	.11	.08½	.11
Linoleate, solid, bbls ... lb.	...	.19	...	.19	...	.19
Metal, c-l, NY (*FP*) 100 lb.	5.85	5.90	5.70	5.90	4.90	5.70
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.11	.14
Oleate, bbls ... lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv ... lb.	...	.08¾	.08	.08¾	.07½	.0815
97% Pb_3O_4, delv ... lb.	...	.086	.084	.086	.0765	.0848
98% Pb_3O_4, delv ... lb.	.0885	.0865	.0865	0885	.08	.0865
Resinate, fused, bbls ... lb.	...	.09½	.09½	.16½	...	.16½
Stearate, bbls ... lb.	...	.25	...	.25	...	.26
Titanate, bbls, c-l, f.o.b. wks, frt all'd ... lb.	...	.10¼	...	.10¼	.10	.10¼
White, 500 lb bbls, wks, lb.	...	.07½	...	.07½	.07	.07½
Basic sulfate, 500 lb bbls, wks ... lb.	...	.07	.06½	.07	.06¼	.06½
Lime, chemical quicklime, f.o.b. wks, bulk ... ton	7.00	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ... ton	8.50	16.00	8.50	16.00	8.50	16.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	.07½	.08½	...	.07½	.07½	.11½
drs ... gal.	.10	.14	.10	.14	.11	.16
Linseed Meal, bgs ... ton	...	33.00	23.00	33.00	23.50	37.00
Litharge, coml, delv, bbls lb.	...	.0760	.07	.0760	.06½	.07½
Lithopone, dom, ordinary, delv, bgs ... lb.	...	.04¼	.0385	.04¼	...	.036
bbls ... lb.	...	.04½	.041	.04½	.03¾	.03¾
Titanated, bgs ... lb.	...	.056	.05¼	.056	...	.05¼
bbls ... lb.	...	.0585	.05½	.0585	...	.05½
Logwood, 51°, 600 lb bbls lb.	...	.13	.10½	.13	.10½	.12½
Solid, 50 lb boxes ... lb.	...	.22	.16½	.22	.16½	.20½
Madder, Dutch ... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	74.00	80.00	65.00	80.00	58.00	70.00
Magnesium Carb, tech, 70 lb bgs, wks ... lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, 375 lb bbls, c-l, wks ... ton	...	32.00	...	32.00	32.00	42.00
Metal Ingots, c-l ... lb.	...	.27	...	...	...	...
Oxide, calc tech, heavy bbls, frt all'd ... lb.	...	.26	...	.26	.25	.30
Light bbls above basis lb.	...	.26	...	.26	.20	.26
USP Heavy, bbls, above basis ... lb.	...	.26	...	.26	.25	.30
Palmitate, bbls ... lb.	.33	.35	.33	.35	.33	nom.
Silicofluoride, bbls ... lb.	.20	.25	.11	.25	.11	.11½
Stearate, bbls ... lb.	...	.31	.23	.31	.23	.27
Manganese, acetate, drs ... lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	16	.15	.16	.15	.16
Chloride, bbls ... lb.	.14	nom.	...	.14	...	...
Dioxide, tech (peroxide), paper bgs, c-l ... ton	...	71.50	...	71.50	62.50	70.00
Hydrate, bbls ... lb.	...	.82	...	.82	...	.82
Linoleate, liq, drs ... lb.	.18	.19½	.18	.19½	.18	.19½
solid, precip, bbls ... lb.	...	19	...	.19	...	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ... lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs ... lb.	.10½	.11½	.10½	.11½	.08	.09¾
Mangrove, 55%, 400 lb bbls lb.						
Bark, African ... ton	37.00	38.00	34.00	38.00	30.00	39.50
Mannitol, pure cryst, cs, wks lb.	...	.85	.85	.90	.90	1.00
commercial grd, 250 lb bbls ... lb.		.40	.35	.45	.38	.50
Marble Flour, blk ... ton	12.50	14.50	12.00	14.50	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.95	2.70	2.95	2.45	2.95
Mercury metal ... 76 lb. flasks	210.00	215.00	167.00	215.00	163.00	228.50
Mesityl Oxide, f.o.b. dest., tks ... lb.	...	.10½	.10½	.15	...	.15
drs, c-l ... lb.	...	.11½	.11½	.16	...	.16
drs, lcl ... lb.	...	.12	.12	.16½	...	.16½
Meta-nitro-aniline ... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ... lb.	1.05	1.10	1.05	1.10	1.05	1.40
Meta-phenylene diamine 300 lb bbls ... lb.	...	.65	...	.65	...	.65
Meta-toluene-diamine 300 lb bbls ... lb.	...	.70	.65	.70	.65	.67
Methanol, denat, grd, drs, c-l frt all'd (*FP*) (*PC*) gal.	...	.60	...	.60	...	.40
tks, frt all'd ... gal.	...	.60	...	.60	...	.40

(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Methanol (continued):						
Pure, drs, c-l, frt all'd gal.	...	.55½	.35½	.55½	.35	.38
tks .... gal.	...	.50	.30	.50	.30	.33
95%, tks .... gal.	...	.52	.29	.52	.28	.31
97%, tks .... gal.	...	.51	.30	.51	.29	.32
Methyl Acetate, tech tks,						
delv .... lb.	.06	.07	.06	.07	.06	.07
55 gal drs, delv ...... lb.	.11	.12½	.07	.12½	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
55 gal drs, delv ...... lb.	.12	.13	.10½	.13	.10½	.11½
Acetone, frt all'd, drs gal. *p*	...	.81	.37½	.81	.41	.44
tks, frt all'd ...... gal. *p*	...	.75	.32	.75	.35	.39
Synthetic, frt, all'd,						
east of Rocky M.,						
drs .... gal. *p*	...	.51	.37½	.51	.36	.44
tks, frt all'd ... gal.	...	.43	.32	.43	.32	.36
West of Rocky M.,						
frt all'd, drs .. gal. *p*	...	.53½	.41½	.53½	.41½	.48
tks, frt all'd .. gal. *p*	...	.45½	.35	.45½	.35	.45½
Anthraquinone .... lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ...... lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb. lots,						
frt all'd .... lb.	...	.55	...	.55	.55	.70
less than 100 lbs. f.o.b.						
wks .... lb.	...	.60	...	.60	.60	.75
Chloride, 90 lb. cyl .... lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	.06	.08	.05½	.06
50 gal drs, frt all'd, c-l lb.	...	.09½	.07	.09½	.06½	.07½
Formate, drs, frt all'd .. lb.	...	.89	...	.89	...	.89
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ... lb.	...	.70	.70	.80	...	.80
Mica, dry grd, bgs, wks .. ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs .... lb.	...	2.50	...	2.50	...	2.50
Mixed Amylnaphthalenes						
mixed, ref., l-c-l, drs, f.o.b.						
wks .... lb.	...	.16	.16	.19	...	...
crude .... lb.	...	.14	.14	.15	...	.
Monoamylamine, c-l, drs, wks lb.	...	.50	.50	.52	...	.52
lcl, drs, wks .... lb.	...	.53	...	.55	...	.55
Monoamylnaphthalene, l-c-l,						
drs, f.o.b. wks .... lb.	...	.17	.17	.20	...	..
Monobutylamine, drs	...	.37	...	.37	...	...
c-l, wks .... lb.	...	.40	...	.40	...	.50
l-c-l, wks .... lb.	...	.48	...	.48	...	.48
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks, lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis)						
lcl, drs, f.o.b. wks ...... lb.	...	.35	.35	.65	...	.65
Monomethylamine, drs, frt						
all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate,						
100 lb drs .... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal,						
wks .... lb.	...	.67	...	.67	...	.75
Myrobalans 25%, liq bbls lb.	no prices		no prices		no prices	
50% Solid, 50 lb boxes lb.	no prices		no prices		no prices	
J1 bgs .... ton	no prices		35.00	48.00	28.50	40.00
J2 bgs .... ton	no prices		28.00	39.00	23.00	34.00
Naphtha, v.m.&p. (deodorized)						
see petroleum solvents.						
Naphtha, Solvent, water-						
white, tks .... gal.	...	.26	...	.26	.26	.27
drs, c-l .... gal.	...	.31	...	.31	.31	.32
Naphthalene, dom, crude bgs.						
wks .... lb. *q*	2.50	2.75	2.25	2.75	2.25	2.75
imported, cif, bgs .... lb.	no prices		no prices		...	3.00
Balls, flakes, pks .... lb.	...	.08	.06¼	.08	.06¼	.07¾
Balls, ref'd bbls, wks .. lb.	...	.08	.07	.08	.06¾	.07
Flakes, re'd, bbls, wks .. lb.	...	.08	.07	.08	.06¾	.07
Nickel Carbonate, bbls ... lb.	.36	.36½	.36	.36½	.36	.36½
Chloride, bbls .... lb.	.18	.20	.18	.20	.18	.20
Metal ingot .... lb.	.35	.36	.34	.36	.34	.35
Oxide, 100 lb kgs, NY . lb.	.35	.38	.35	.38	.35	.38
Salt, 400 lb bbls, NY .. lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, sulfate, 40%, drs,						
55 lb drs .... lb.	...	.703	...	.703	...	.70
Nitre Cake, blk .... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000						
lb drs, wks .... lb.	.08	.09	.08	.09	.08	.10
tks .... lb.	...	.07	...	.07	...	.07
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.20	.29
Nitrogen Sol. 45½% ammon,						
f.o.b. Atlantic & Gulf ports,						
tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
Nitrogenous Mat'l, bgs imp unit	no prices		no prices		2.20	2.60
dom, Eastern wks ... unit	2.75	3.00	2.20	3.00	2.20	2.90
dom, Western wks ... unit	2.60	nom.	1.75	2.60	1.95	2.00
Nitronaphthalene, 550 lb bbls lb.	.24	25	.24	.25	.24	.25
Nutgalls Alleppo, bgs .... lb.	no prices		.26	.29	.28	.30
Oak Bark Extract, 25%, bbls lb.	.03½	.03¾	.03⅛	.03¾	.03⅛	.03⅛
tks .... lb.	...	.03	.02¾	.03	...	.02¾
Octyl Acetate, tks, wks .. lb.	...	.15	...	.15	...	.15
Orange-Mineral, 1100 lb cks						
NY .... lb.	..	.11½	.11	.11½	.10½	.13½
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Ortho amyl phenol, l-c-l, drs,						
f.o.b. wks .... lb.	...	.25	.15	.25	...	...
Orthoanisidine, 100 lb drs lb.	...	.70	...	.70	.70	.74
Orthochlorophenol, drs ... lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.17	.17½	.16	.17½	.16	.16½
Orthodichlorobenzene, 1000						
lb drs .... lb.	.06	.07½	.06	.07½	.06	.07
Orthonitrochlorobenzene, 1200						
lb drs, wks .... lb.	.15	.18	.15	.18	.15	.18

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Orthonitroparachlorphenol, tins ....lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs ....lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks ....lb.	...	.09	...	.09	...	.09
Orthotoluidine, 350 lb bbls, lcl ....lb.	...	.19	...	.19	...	.19
Osage Orange, cryst, bbls lb.	...	.23	.21	.23	...	.21
51° liquid ....lb.	...	.10	...	.10	...	.10
Paraffin, rfd, 200 lb bgs (*PC*)						
122-127° M P ....lb.	...	.04¼	.04¼	.057	.02¼	.0675
128-132° M P ....lb.	.04¾	...	.057	.0595	.057	.0705
133-137° M P ....lb.	.05¼	.06½	.06¼	.06½	.06¼	.0755
Para aldehyde, 99%, tech, 55-110 gal drs, wks ..lb.	...	.12	.10	.12	.10	.11¼
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ....lb.	...	.32	...	.32	...	.32
Dichlorobenzine 200 lb drs, wks ....lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks (*FP*) ....lb.	.23	.24	.23	.24	.34	.35
Nitroacetanilid, 300 lb bbls ....lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	...	.45	...	.45	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	...	.15	...	.15	.15	.16
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	...	.35	...	.35	.35	.37
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.30	...	.30	...	.30
Phenylenediamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb. bbls ....lb.	...	.70	...	.70	.70	.75
tks, wks ....lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	...	.48	...	.48	.48	.50
Paris Green, dealers, drs lb.	.24	.26	.23	.25	.23	.26
Pentane, normal, 28-38° C, group, 3 tks ....gal.	...	.08½	...	.08½	...	.08½
drs, group 3 ....gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd (*FP*) ....lb.	.08	.08½	.08	.08½	.08	.08¼
Petrolatum, dark amber, bbls ....lb.	...	.03½	.02¾	.03½	.02¾	.05
White, lily, bbls ....lb.	...	.05¾	.04¾	.05¾	.04¾	.08½
White, snow, bbls ....lb.	...	.06½	.05½	.06½	.05½	.09½
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.16	.13½	.16	...	.13½
drs, group 3 ....gal.	...	.18	.14½	.18	.14½	.25½
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks ....gal.	.07⅛	...	.07	.07⅛	.06⅞	.07
East Coast, tks, wks gal.	.10½	...	.10	.10½	.09	.10½
Lacquer diluents, tks						
East Coast ....gal.	...	.11	.09½	.11	.09½	.10
Group 3, tks ....gal.	.07⅜	.08⅛	.06¼	.08⅛	.07⅜	.07⅞
Naphtha, V.M.P., East tks, wks ....gal.	.11	...	.09	.11	.09½	.10
Group 3, tks, wks ...gal.	.07⅛	...	.06	.07⅛	.06⅜	.07⅞
Petroleum thinner, 43-47, East, tks, wks ....gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Group 3, tks, wks ...gal.	.06	.07	.05⅞	.07	.05⅞	.07
Rubber Solvents, stand grd, East, tks, wks ..gal.	...	.10½	.09½	.10½	.09½	.10
Group 3, tks, wks ...gal.	...	.07⅛	.06	.07⅛	.06⅜	.07⅞
Stoddard Solvents, East, tks, wks ....gal.	...	.09½	.083	.09½	.08¾	.09½
Group 3, wks ....gal.	...	.06⅝	.05½	.06⅝	.06⅜	.06½
Phenol, 250-100 lb drs ....lb.	.12½	.13	.12	.13¾	.12	.14¾
tks, wks (*FP*) ....lb.	.11½	.12	.11	.12	.11	.12
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ....lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com ....lb.	...	1.50	...	1.50	...	1.50
Phloroglucinol, tech, tins ..lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons ....lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
70% basis ....ton	2.30	2.40	2.15	2.40	1.85	1.90
72% basis ....ton	2.75	3.00	2.50	3.00	2.15	2.35
Florida Pebble, 68% basis ton	...	2.00	1.90	2.00	1.90	2.85
75-74% basis ....ton	2.75	3.00	...	2.90	3.00	3.85
Tennessee, 72% basis ..ton	...	5.00	4.50	5.00	...	4.50
Phosphorus Oxychloride 175 lb. cyl (*FP*) ....lb.	.15	.18	.15	.18	.15	.20
Red, 110 lb cases ....lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs .lb.	.38	.42	.38	.42	.38	.44
Trichloride, cyl ....lb.	.15	.16	.15	.16	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, 100 lb drs, wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	...	.65	.50	.65	.53	.56
Steam dist wat wh bbls gal.	.65	.68	.59	.68	...	.59
Pitch Hardwood, wks ...ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks ....ton	19.00	22.00	19.00	22.00	...	19.00

(*FP*) Full Priority. (*PC*) Price Control

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Pitch (continued)						
Burgundy,dom,bbls,wks lb.	.05½	.06	.06	.06½	.05½	.06½
Imported ....lb.	no prices		no prices		no prices	
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.75	7.00	6.00	7.00	6.00	6.50
Polyamylnaphthalene, l-c-l, drs, f.o.b. wks ....lb.	...	.25	.25	.30	...	...
Potash, Caustic, wks, sol ..lb	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake ....lb.	...	.07	...	.07	.07	.07½
liquid, tks ....lb.	...	.02⅞	...	.02⅞	.02⅞	.03¾
Manure Salts, Dom 30% basis, blk .....unit	...	.60	...	.60	.53½	.58½
Potassium Abietate, bbls ..lb.	...	.08	...	.08	.08	.09
Acetate, tech, bbls, delv lb.	...	.28	.26	.28	...	.26
Bicarbonate, USP, 320 lb bbls ....lb.	...	.14	.14	.17	...	.18
Bichromate Crystals, 725 lb csks *(*FP*) ....lb.	.09⅝	...	.08⅞	.09⅝	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.06¾	.06½	.06¾	.06½	.07
liquid, tks ....lb.	...	.0275	...	.0275	.0275	.03
drs, wks ....lb.	.03	.03⅛	.03	.03⅛	.03	.03½
Chlorate crys, 112 lb kgs, wks (*FP*) ....lb.	nom	.11	...	.11	.10½	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	.09¾	.10	.09½	.10	.10	.12½
Chloride, crys, bbls ....lb.	.08	nom.	.04	.08	.04	.04¼
Chromate, kgs (*FP*) ...lb.	.24	.27	.24	.27	.24	.27
Cyanide, drs ....lb.	...	.55	...	.55	.55	.75
Iodide, 250 lb bbls .....lb.	1.44	1.38	1.35	1.38	...	1.35
Metabisulfite, 300 lb bbls lb.	.18	.20	.18	.21	.13	.19
Muriate, bgs, dom, blk unit	.56	.58	.53½	.58	...	.53½
Oxalate, bbls ....lb.	.28	.30	.25	.30	.25	.26
Perchlorate, kgs, wks (*FP*) ....lb.	.09½	.11	.09½	.11	.09½	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks (*FP*) ....lb.	.19¾	.21	.19¼	.21	.18½	.20½
Prussiate, red, bbls ....lb.	no prices		no prices		.38	.45
Yellow, bbls ....lb.	.17	.19	.16	.19	.15	.18
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	34.25	36.25
Titanium Oxalate, 200 lb bbls ....lb.	...	.40	...	.40	.40	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	26.00	26.00	27.00	24.75	27.00
Propane, group 3, tks ....lb.	.03	...	.03¾	.04	.03	.04⅜
Putty, com'l, tubs ....100 lb.	...	3.15	...	3.15	...	6.00
Linseed Oil, kgs ...100 lb.	...	5.00	...	5.00	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd ....gal.	4.30	...	4.40	4.95	4.75	7.50
3.6% pyrethrins, drs, frt all'd ....gal.	6.35	...	6.60	7.20	7.20	11.00
Flowers, coarse, bgs ...lb.						
bgs ....lb.	.21	.22	.20	.25	.23	.36
Fine powd, bbls .....lb.	.22	.23	.21	.26	.25	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	...	1.71
Refined, drs ....lb.	...	.46	...	.48	...	.51
Pyrites, Spanish cif Atlantic ports, blk ....unit	no prices		no prices		.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.40
Quebracho, 35% liq tks ..lb.	...	.05¼	.03¾	.05½	.03¼	.03¾
450 lb bbls, c-l ......lb.	...	.05	.04¼	.05	.04	.04¼
Solid, 63%, 100 lb bales cif ....lb.	...	.04⅞	...	.04⅞	.04½	.04⅞
Clarified, 64% bales ..lb.	...	.05	.05	.05⅛	.04¾	.05⅛
Quercitron, 41 deg liq, 450 lb. bbls ....lb.	.08½	.09½	.08½	.09½	.08½	.09½
Solid, drs ....lb.	.11	.16½	.11	.16½	.10	.16½
R Salt, 250 lb bbls, wks ..lb.	...	.55	...	.55	...	.55
Resorcinol, tech cans .....lb.	.68	.74	.68	.74	.75	.80
Rochelle Salt, cryst ......lb.	.43½	...	.32½	.43½	.22¼	.29¾
Powd, bbls ....lb.	.42½	...	.31½	.42½	.21¾	.28¾
Rosin Oil, bbls, first run gal.	...	.48	.40	.50	...	.50
Second run ....gal.	...	.50	.42	.56	.52	.56
Third run, drs ....gal.	...	.54	.46	.57	.56	.57
Rosins 600 lb bbls, 100 lb unit ex, yard NY:**						
B	...	3.55	2.06	3.55	1.80	2.45
D	...	3.55	2.08	3.55	1.87	2.48
E	...	3.62	2.07	3.62	1.95	2.51
F	...	3.59	2.08	3.59	2.10	2.51
G	...	3.52	2.18	3.52	2.10	2.48
H	...	3.50	2.27	3.50	2.10	2.48
I	...	3.50	2.26	3.50	2.10	2.54
K	...	3.61	2.36	3.61	2.12	2.75
M	...	3.68	2.38	3.68	2.20	2.81
N	...	3.71	2.47	3.71	2.39	2.85
WG	...	4.52	2.79	4.52	2.68	3.17
WW	...	4.57	3.05	4.57	3.00	3.40
X	...	4.57	3.10	4.57	...	...
Rosins, Gum, Savannah (280 lb. unit):**						
B	...	3.00	1.31	3.00	1.15	1.80
D	...	3.00	1.51	3.00	1.22	1.83
E	...	3.07	1.60	3.07	1.30	1.86
F	...	3.04	1.62	3.04	1.45	1.86
G	...	2.97	1.60	2.97	1.45	1.83
H	...	2.95	1.63	2.97	1.45	1.83
I	...	2.95	...	2.98	1.45	1.89
K	...	3.06	1.84	3.06	1.47	2.10
M	...	3.13	2.01	3.13	1.55	2.16

* Spot price is ⅛c higher. ** Jan. 24, 1941, high and low based on 280 lb. unit.

(*FP*) Full Priority.

Rosins
Sodium Pyrophosphate

Prices

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Rosins (continued):						
N	...	3.16	2.65	3.16	1.70	2.20
WG	...	3.97	2.76	3.97	2.03	2.52
WW	..	4.02	2.96	4.02	2.25	2.75
X	...	4.02	2.96	4.02	2.35	2.75
Rosin, Wood, c-l, FF grade, NY	1.70	2.00	1.40	2.00	1.40	1.54
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	25.50	37.50
Imported, lump, bbls ... lb.	no prices		no prices		...	.14
Powdered, bbls ..... lb.	no prices		no prices		.08½	.10
Sago Flour, 150 lb bgs lb.	.04½	.05½	.03½	.05½	.04	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks ... ton	...	15.00	13.00	17.00	...	17.00
Chrome, c-l, wks ..... ton	...	16.00	...	16.00	11.00	16.00
Saltpetre, gran, 450-500 lb bbls ... lb.	...	.082	.076	.082	.071	.08
Cryst, bbls ... lb.	...	.092	.086	.092	.081	.08¾
Powd, bbls ... lb.	...	.092	.086	.092	.081	.10
Satin, White, pulp, 550 lb bbls ... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ..... lb.	...	46	...	.46	.46	.48
Shellac, Bone dry, bbls .. lb. *s*	.39	.40	.26	.40	.23	.27
Garnet, bgs ... lb.	.37	.39	.20	.39	.18½	.23
Superfine, bgs ... lb. *s*	.33	.34	.16½	.34	.14½	.20½
T. N., bgs ... lb. *s*	.32	.33	.16	.33	.13½	.19½
Silver Nitrate, vials ..... oz.	...	.26⅞	.24	.26⅞	.26¾	.27⅜
Slate Flour, bgs, wks .... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
blk ... 100 lb.	...	.90	...	.90	.	.90
paper bgs ... 100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
bbls ... 100 lb.	...	1.35	1.35	1.45	1.35	1.45
Caustic, 76% grnd & flake, drs ... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ..... 100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks .. 100 lb.	...	2.00	...	2.00	1.95	1.97½
SODIUM						
Sodium Abietate, drs ..... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks lb.	.04½	.05	.04	.06	.04	.05
90%, bbls, 275 lb delv lb.	.06½	.07	.06	.07	.06	.06¾
anhyd, drs, delv ..... lb.	.08½	.10	.08¼	.10	.08¼	.10
Alginate, drs ... lb.	.69	.73	.39	.73	.39	.96
Antimoniate, bbls ..... lb.	.15	.15½	.14	.15½	.14½	.15
Arsenate, drs ... lb.	.08	...	.07	.08¾	.07	.08¾
Arsenite, liq, drs ..... gal.	...	.35	...	.35	...	.35
Dry, gray, drs, wks .. lb.	...	.06¾	.06½	.09¼	.06½	.09½
Benzoate, USP kgs lb.	.46	.50	.46	.50	.46	.52
Bicarb, powd, 400 lb bbl, wks 100 lb.	...	1.70	...	1.70	1.70	1.85
Bichromate, 500 lb cks, wks* (*FP*) ... lb.	...	.07⅜	.06⅞	.07½	.06¼	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.03	.031
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.30	1.80
Chlorate, bgs, wks lb.	...	.06¼	...	.06¼	.06¼	.08½
Cyanide, 96-98%, 100 & 250 lb drs, wks lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ... lb.	...	.10	.09	.10	.08½	.09
Fluoride, white 90%, 300 lb bbls, wks lb.	...	.08	.07	.08	.07	.08
Hydrosulfite, 200 lb bbls, f.o.b. wks lb.	.17	.18	.17	.18	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	...	2.80	2.80	3.05
Tech, reg cryst, 375 lb bbls, wks ... 100 lb.	2.45	...	2.45	...	2.45	2.80
Iodide, jars ... lb.	...	2.42	..	2.42	2.30	2.42
Metanilate, 150 lb bbls lb.	.41	...	.41	nom.	.41	.42
Metasilicate, gran, c-l, wks 100 lb.	...	2.50	2.35	2.50	...	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	...	3.05
Anhydrous, wks, cl, drs 100 lb.	...	4.00	3.75	4.00	3.75	3.75
wks, lcl, drs, 100 lb.	5.05	5.05	5.05	5.05	5.05	5.05
Monohydrated, bbls .... lb.	...	.026	.023	.026	...	.023
Naphthenate, drs lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	..	.50	...	.50
Nitrate, 92% crude, 200 lb. bgs, c-l, NY ... ton	...	29.35	28.70	29.35	...	28.30
100 bgs, same basis .. ton	...	30.05	29.40	30.05	...	29.00
Bulk ... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .. lb.	.06¾	...	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l ... lb.	...	.04½	.03	.04½	...	.03
Perborate, drs, 400 lb .. lb.	.14¾	...	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb .. lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	2.75	2.90	2.30	2.90	...	2.30
bgs, wks 100 lb.	2.55	2.70	2.10	2.70	...	2.10
Tri-sodium, tech, 325 lb bbls, wks ... 100 lb.	2.90	3.05	2.45	3.05	...	2.45
bgs, wks 100 lb.	2.70	2.85	2.25	2.85	...	2.25
Picramate, 160 lb kgs lb.	...	.65	...	.65	.65	.67
Prussiate, Yellow, 350 lb bbls, wks lb.	.11	...	.10½	.11	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	.0510	.0610	.0510	.0610	...	.0530

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

(*FP*) Full Priority.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Sodium (continued):						
Sesquisilicate, drs, c-l, wks ....100 lb.	...	3.05	...	3.05	2.00	2.90
Silicate, 60°, 55 gal drs, wks ....100 lb.	no prices		1.40	1.80	1.40	1.80
40°, 55 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ......100 lb.	no prices		...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.12	.15	.09¾	.15	...	...
Stannate, 100 lb drs ....lb.	.33½	.36½	.32½	.37	.31½	.35½
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ....100 lb. ƚ	1.70	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks ....lb.	.024	...	.02¼	.03	.02¼	.03
Solid, 650 lb drs, c-l, wks ....lb.	.0315	...	.03	.03¾	.03	.03¾
Sulfite, powd, 400 lb bbls wks ....lb.	...	.05¼	...	.05¼	.023	.05¼
Sulfocyanide, drs ......lb.	.55	.65	.28	.65	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		no prices	
Sorbitol, drs, wks ....lb.	...	.17¾	.14¾	.17¾	.14¾	.16
Spruce, Extract, ord, tks ..lb.	...	.01¼	.01⅛	.01¼	...	.01⅛
Ordinary, bbls ....lb.	...	.01¾	.01⅝	.01¾	...	.01⅝
Super spruce ext, tks ..lb.	...	.01½	.01⅜	.01½	...	.01⅜
Super spruce ext, bbls ..lb.	...	.02	.01⅞	.02	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	3.10	2.90	3.10	2.50	2.95
Powd, 140 lb bgs ..100 lb.	...	3.20	3.05	3.80	2.60	3.05
Potato, 200 lb bgs .....lb.	.0585	...	.04½	.0585	.05	.07½
Imp, bgs ....lb.	no prices		no prices		...	.06½
Rice, 200 lb bbls ......lb.	.08½	.09½	.07½	.09½	.07¼	.08½
Sweet Potato, 240 lb bbls, f.o.b. plant ......100 lb.	nom.	7.00	nom.	7.00	5.50	7.00
Wheat, thick, bgs .....lb.	...	.05	...	.05	.05¼	.05½
Strontium, carbonate, 600 lb bbls, wks ....lb.	no prices		no prices		.22	.23
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Sucrose, octa-acetate, den, grd, bbls, wks ....lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
SULFUR						
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ...100 lb.	1.65	1.95	1.40	1.95	1.40	2.35
bbls ....100 lb.	1.95	2.50	1.95	2.50	1.95	2.70
Rubbermakers, bgs .100 lb.	...	2.05	...	2.05	2.00	2.80
bbls ....100 lb.	...	2.35	...	2.35	2.35	3.15
Extra fine, bgs ....100 lb.	...	2.35	...	2.35	2.85	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.05	3.35	2.80	3.35	2.80	3.75
bbls ....100 lb.	3.40	3.70	3.15	3.70	3.15	4.10
Roll, bgs ....100 lb.	2.40	2.70	2.15	2.70	2.15	3.10
bbls ....100 lb.	2.30	2.85	2.30	2.85	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.08	.03	.08	.03	.08
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.06	.04	.06	.04	.06
Refrigeration, cyl, wks .lb.	.16	.40	.16	.40	.16	.40
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	no prices		no prices		98.00	140.00
Extract, 42°, bbls ......lb.	.08	.06¼	.06	.08	.06	.06¼
Superphosphate, 16% bulk, wks ....ton	...	10.00	8.50	10.00	8.50	9.00
Run of pile ....ton	...	9.50	8.00	9.50	8.00	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit .....ton	...	.80	.68	.80	.68	.70
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	15.00
Ref'd 100 lb bgs, NY ton	17.25	19.25	17.25	19.25	14.00	17.25
French, 220 lb bgs, NY ton	no prices		no prices		23.00	35.00
Ref'd, white bgs, NY ton	no prices		no prices		45.00	60.00
Italian, 220 lb bgs to arr ton	no prices		no prices		64.00	70.00
Ref'd, white bgs, NY ton	no prices		no prices		65.00	78.00
Tankage, Grd, NY ....unit ᵾ	...	4.10	2.35	4.10	2.35	3.25
Ungrd ....unit ᵾ	...	4.85	2.35	5.10	2.35	3.25
Fert grade, f.o.b. Chgo unit ᵾ	...	5.35	2.35	5.60	2.40	3.50
South American cif unit ᵾ	...	5.05	2.60	4.75	2.50	3.50
Tapioca Flour, high grade, bgs ....lb.	.04	.06½	.03	.06¾	.02¾	.05
Tar Acid Oil, 15%, drs .gal.	.22	.24	.22	.24	.22	.24
25% drs ....gal.	...	.27½	.25	.27½	.25	.28
Tar, pine, delv, drs ....gal.	...	.29	.26	.29	.26	.27
tks, delv, E. cities ....gal.	...	.22	...	.22	...	.21
Tartar Emetic, tech, bbls .lb.	...	.47¾	.36¾	.47¾	.34¾	.36¾
USP, bbls ....lb.	.52¾	.53	.42	.53	.40	.42
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09	.08	.09½
Tetralene, 50 gal drs, wks lb.	...	.19	.19	.21	.12	.18
Thiocarbanilid, 170 lb bbls lb.	...	.24	...	.24	.20	.25
Tin, crystals 500 lb bbls, wks lb	.39	.39½	.38	.40	.36	.40½
Metal, NY (*PC*) ......lb.	* ...	.52	.501	.52¾	.45½	.55
Oxide, bbls, wks ....lb.	.55	.57	.54	.56	.51	.56
Tetrachloride, 100 lb drs, wks ....lb.	...	.31	.25¼	.31	.23	.26½
Titanium Dioxide, 300 lb bbls lb.	...	.14½	.13¾	.14½	.13	.16
Barium Pigment, bbls ..lb.	.05¾	.06½	.05¾	.06½	.05¼	.06½
Calcium Pigment, bbls .lb.	.05½	.05¾	.05½	.05¾	.05	.06¼

ƚ Bags 15c lower; ᵾ + 10; * Dec. 31. (*PC*) Price Control.

	Current Market		1941 Low	1941 High	1940 Low	1940 High
Titanium tetrachloride, drs, f.o.b. Niagara Falls ....lb.	.32	.45	.32	.45	.32	.45
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls .....lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks ....lb.	...	.26	...	.26	.26	.27
Toluol, drs, wks (*FP*) ..gal.	...	.33	.32	.33	.27	.32
tks, frt all'd (*FP*) ....gal.	...	.28	.27	.28	.22	.27
Toner Lithol, red, bbls ...lb.	.55	.60	.55	.60	.55	.60
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.75
Toluidine, bgs ....lb.	...	1.05	...	1.05	1.05	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks, lb.	...	.33	.27	.33	...	.27
Triamylamine, drs, lcl, wks, drs ....lb.	...	.90	...	.90	.78	.90
Tributylamine, lcl, drs, f.o.b. wks ....lb.	...	.70	...	.70	.67	.70
Tributyl citrate, drs, frt all'd lb.	...	.24	.24	.26	.24	.35
Tributyl Phosphate, frt all'd lb.	...	.47	.42	.47	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	...	.08	.08	.09	.08	.09
Tricresyl phosphate, tech, (*FP*) ....lb.	...	.25	.22	.36½	.22	.36½
Triethanolamine, 50 gal drs, wks ....lb.	...	.19	...	.19	.19	.22
tks, wks ....lb.	...	.18	...	.18	.18	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	1.05
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.54	.50	.54	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ....lb.	...	.85	.85	1.00	...	1.00
Triphenylguanidine ....lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs (*FP*) ....lb.	...	.88	.38	.88	...	.38
Tripoli, airfloated, bgs, wks ton	21.00	26.00	21.00	26.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.79½	.45	.83	.32½	.40
Savannah, bbls ....gal.	...	.67½	.33½	.72½	.26½	.34
Wood Steam dist, drs, c--lcl, NY ....gal.	...	.75	.35	.76	.27	.34½
Wood, dest dist, cl-lcl, drs, delv E. cities ......gal.	.62	.65	.35	.65	.25	.32
Urea, pure 112 lb cases ..lb.	...	.12	...	.12	.12	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	no prices		no prices		...	110.00
Dom f.o.b., wks ....ton	...	85.00	...	85.00	85.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121.58	...	121.58	...	121.50
Valonia beard, 42%, tannin bgs ....ton	no prices		no prices		47.00	56.00
Cups, 32% tannin bgs..ton	no prices		no prices		33.00	39.00
Extract, powd, 63% ...lb.	no prices		no prices		.0565	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots .....lb.	...	2.60	...	2.60	...	2.60
Ex-guaiacol ....lb.	...	2.30	2.30	2.50	...	2.50
Ex-lignin ....lb.	...	2.55	2.50	2.55	...	2.50
Vermilion, English, kgs lb.	3.12	3.17	3.12	3.17	...	2.76
Wattle Bark, bgs ....ton	41.00	43.00	37.50	43.00	34.00	38.75
Extract, 60°, tks, bbls lb.	.046	.0475	.03⅞	.05	.03⅞	.04¼
Wax, Bayberry, bgs ......lb.	.18	.20	.18	.20	.25	.30
Bees, bleached, white 500 lb slabs, cases ......lb.	...	.56	.36½	.56	.35	.38
Yellow, African, bgs lb.	.46	.47	.30	.47	.23	.29
Brazilian, bgs ..lb.	.50	...	.31	.50	.24	.31
Refined, 500 lb slabs, cases lb.	.51	.52	.35	.52	.29	.36
Candelilla, bgs ....lb.	...	.33	.19	.33	.18	.19
Carnauba, No. 1, yellow, bgs ....lb.	...	.88	.68	.88	.58	.85
No. 2, yellow, bgs ...lb.	.84	.85	.66	.85	.57	.84
No. 2, N. C., bgs ....lb.	.78	.79	.62	.79	.46	.73
No. 3, Chalky, bgs ...lb.	...	.78	.55	.78	.43	.66
No. 3, N. C., bgs ....lb.	.78	.79	.58	.79	.47	.68
Ceresin, dom, bgs .....lb.	.13½	.14	.11	.14	.11½	.15
Japan, 224 lb cases ....lb.	.30	.31	.16½	.35	.15½	.16½
Montan, crude, bgs ....lb.	.45	.46	.45	.46	no prices	
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.24	.25	.24	.25	.22	.25
Cakes, cases ....lb.	.25	.26	.25	.26	.23	.25
Wood Flour, c-l, bgs ....ton						
bgs, c-l, wks ....ton	24.00	25.00	24.00	25.00	20.00	30.00
Whiting, chalk, com 200 lb	18.00	19.00	18.00	19.00	11.50	19.00
Gilders, bgs, c-l, wks ..ton	16.00	20.00	16.00	20.00	12.00	20.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.27	...	.29	...	.30
Com'l tks, wks, frt all'd gal.	...	.27	.26	.27	...	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	.20
Zinc Acetate, tech, bbls, lcl, delv ....lb.	.15	.16	.15	.16	.15	.16
Arsenite, bgs, frt all'd ..lb.	...	.12	...	.12	.12	.12½
Carbonate tech, bbls, NY lb.	.14	.20	.14	.20	.14	.16
Chloride fused, 600 lb drs, wks ....lb.	...	.05	...	.05	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.0575	...	.0575	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.50	2.25	2.50	...	2.25

(*FP*) Full Priority.

	Current	Market	1941 Low	1941 High	1940 Low	1940 High
Zinc (continued)						
Cyanide, 100 lb drs ....lb.	.33	.37	.33	.37	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.1035	.09¼	.1035	.07½	.08½
Metal, high grade slabs, c-l,						
NY (*FP*) (*PC*) 1000 lb.	...	8.64	7.65	8.64	5.90	7.64
E. St. Louis .....100 lb.	...	8.25	7.25	8.25	4.60	7.25
Oxide, Amer, bgs, wks lb.	...	.07¼	.06½	.07¼	.06¼	.07½
French 300 lb bbls, wks lb.	...	.07¼	.06¾	.07¼	.06¼	.07¾
Palmitate, bbls ....lb.	.32	.33	.24½	.33	.23	.27½
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls ....lb.	.30	.31	.22	.31	.21½	.24½
Sulfate, crys, 40 lb bbls						
wks ....lb.	...	.365	.315	.365	.0275	.029
Flake, bbls ....lb.	...	.405	.335	.405	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.08		.08	.07¾	.08
bgs, delv ....lb.	.14	.14¼	.08	.13¼	.07½	.09⅜
Sulfocarbolate, 100 lb kgs lb.	.24	.29	.03⅜	.07¾	.02¾	.03¼
Zirconium Oxide, crude,						
70-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current	Market	1941 Low	1941 High	1940 Low	1940 High
Babassu, tks, futures .....lb.	no prices		...	.06	.05¾	.06⅝
Castor, No. 3, 400 lb drs lb.	...	.12½	.0180	.12½	.0165	.0190
(*PC*) Blown, 400 lb drs lb.	...	.14	.11¾	.14	.11¾	.14¾
China Wood, drs, spot NY lb.	.36	.37¼	.27¼	.37¼	.22½	.28
Tks, spot NY ....lb.	.35	.35½	.26¼	.35½	.21½	.27
Coconut, edible, drs NY ..lb.	...	.15½	.08	.15½	.07½	.09⅜
Manila, tks, NY ....lb.	.09½	.10	.03⅜	.10	.02¾	.03¼
Tks, Pacific Coast ....lb.	...	no prices		.03¼	.02¾	.03⅛
Cod, Newfoundland, 50 gal						
bbls ....gal.	.78	.80	.07½	.80	.08	.10
Copra, bgs, NY ....lb.	.04¼	nom.	.0180	.04¼	.0165	.0190
Corn, crude, tks, mills ...lb.	...	.12	.06⅝	.13	.05⅛	.06½
Refd, 375 lb bbls, NY ..lb.	...	.15	.14¾	.16	.07⅞	.09
Degras, American, 50 gal						
bbls, NY ....lb.	.08¼	.08¾	.07½	.08¾	.08	.10
Greases, Yellow ....lb.	...	.08½	.04¾	.08½	.03	.05¼
White, choice, bbls, NY lb.	...	.09	.05	.09	.03⅜	.05⅝
Lard, Oil, Edible, prime ..lb.	...	.14½	.08½	.14½	.08	.10
Extra, bbls ....lb.	...	.13¾	.08¼	.13¾	.06¾	.09⅜
Extra, No. 1, bbls .....lb.	...	.13¼	.08	.13¼	.06⅞	.08⅞
Linseed, Raw less than 5						
drs lots ....lb.	...	.1190	.091	.123	.09	.116
drs, c-l, spot ....lb.	...	.111	.095	.190	.084	.110
Tks ....lb.	...	.102	.084	.1060	.078	.104
Menhaden, tks, Baltimore gal.	...	.60	.30	.60	.21	.35
Refined, alkali, drs ....lb.	.116	.122	.084	.122	.067	.088
Kettle boiled, drs .....lb.	.126	.132	.096	.132	.079	.10
Light pressed, drs .....lb.	.106	.112	.082	.112	.061	.085
Tks ....lb.	...	.10	.072	.10	.055	.072
Neatsfoot, CT, 20°, bbls, NY lb.	...	.19	.18¼	.26½	.15¼	.19¼
Extra, bbls, NY ....lb.	...	.14	.08¼	.14	.06⅞	.09
Pure, bbls, NY ....lb.	...	.17¾	.12¼	.17¾	.08	.14¼
Oiticica, bbls ....lb.	.22½	.23½	.16½	.23½	.17	.21
Oleo, No. 1, bbls, NY ...lb.	...	.13¼	.07⅜	.13¼	.07⅜	.07¾
No. 2, bbls, NY ......lb.	...	.13	.07⅜	.13	.07⅜	.07¾
Olive, denat, bbls, NY ..gal.	4.00	4.25	2.25	4.25	.94	2.40
Edible, bbls, NY ......gal.	5.00	5.30	4.75	5.30	1.85	3.25
Foots, bbls, NY ....lb.	.18	.19	.10¼	.19	.08	.10¼
Palm, Kernel, bulk ......lb.	no prices		no prices		no prices	
Niger, cks ....lb.	...	.09	.04¼	.09	.03¼	.05½
Sumatra, tks ....lb.	...	.09	.02	.09	.02⅛	.03
Peanut, crude, bbls, NY ..lb.	.12	...	.08¾	.13	.06¾	.09
Tks, f.o.b. mill ....lb.	.13	...	.05¼	.16	.05⅛	.07⅛
Refined, bbls, NY .....lb.	...	.16	.08	.16	.07⅜	.09¾
Perilla, drs, NY ....lb.	.22½	.23	.18	.23	.19	.21
Tks, Coast ....lb.	...	.21½	.16½	.21½	.18½	.20
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	.17	.18	.16½	.18	.17	.17½
Denatured, drs, NY ..gal.	no prices		.95	1.00	1.00	1.05
Red, Distilled, bbls ......lb.	.12	.13	.07¼	.13	.06¼	.09½
Tks ....lb.	.11¼	...	.06¼	.11½	.05¾	.08
Sardine, Pac Coast, tks ..gal.	...	.60	.39	.62½	.31	.39
Refined alkali, drs .....lb.	.60	.62½	.39	.62½	.31	.39
Light pressed, drs .....lb.	.116	.122	.084	.122	.067	.088
Tks ....lb.	.106	.112	.078	.112	.061	.082
Sesame, white, dom ......lb.	nom.	.09½	..	.09½	.07¼	11¼
Soy Bean, crude						
Dom, tks, f.o.b. mills ..lb.	.12	.12¾	.05⅜	.12¾	.06¼	.07⅝
Crude, drs, NY ....lb.	..	.12¼	.06¼	.12¼	.05¾	.07¾
Ref'd, drs, NY ....lb.	.11½	.11¾	.05½	.12¼	.04¾	.06¼
Tks ....lb.	.12¾	.13	.07⅝	.13½	.07¼	.08½
Sperm, 38° CT, bleached						
(*FP*) bbls, NY ......lb.	...	.127	.11	.127	.105	.11
45° CT, blchd, bbls, NY lb.	...	.12	.103	.12	.098	.103
Stearic Acid, double pressed						
dist bgs ....lb.	.12¾	.13¾	.09½	.13¾	.09¾	.13
Double pressed saponified						
bgs ....lb.	.13	.14	.09¾	.14	.10	.13¾
Triple pressed dist bgs lb.	.15½	.16½	.12½	.16½	.12½	.16½
Stearine, Oleo, bbls ......lb.	nom	.09	..	.09	.05¼	.06½
Tallow City, extra loose ..lb.	.07⅜		...	.07⅜	.03⅜	.05⅜
Edible, tierces ....lb.	no prices		.	.05⅛	.04⅛	.05¾
Acidless, tks, NY ......lb.	...	.11½	.07½	.11½	.06¼	.08
Turkey Red, single, drs ..lb.	...	.08¼	.06½	.08¼	.082	.09
Double bbls ....lb.	...	.09½	.09½	.11	11	.12¾
Whale:						
Winter bleach, bbls, NY lb.	...	.1110	.099	.1110	...	.095
Refined, nat, bbls NY ..lb.	...	.1070	.095	.1070	...	.091

(*FP*) Full Priority. (*PC*) Price Control.

PROFESSIONAL DIRECTORY

Booklets & Catalogs

Chemicals

A355. Bakelite C-9 Resins for the Paint and Varnish Industry; 12-page booklet describes the various types of Bakelite C-9 Resins that have been developed for the production of both heat-reactive and air-drying coatings, and indicates suggested applications. Emphasis is also placed on their use with domestic oils such as linseed, soya, and dehydrated castor. Bakelite Corp.

A356. Facts about U. S. Government Finishes; convenient file folder contains data sheets on the widely used Army and Navy specification finishes and tells how and where they are applied. Roxalin Flexible Lacquer Co.

A357. Platinum Metal Catalysts; some notes on their uses and a list of their most active available forms. Baker & Co., Inc.

A358. Resinox; beautifully illustrated catalog prepared to give information on line of plastics and to show how the company's facilities to produce these materials have been modernized and stepped up. Describes manufacture, molding, uses, fillers and related Resinox properties and information on the buying of these materials. Monsanto Chemical Co.

A359. Rubber Putty; catalog section describes properties of the product, lists the grades, gives the directions for use and a list of applications in which it has proved successful. The B. F. Goodrich Co.

A360. Solutions to Your Transparent Enclosure Problems With Du Pont 'Lucitie'; 16-page booklet tells how transparent plastic sections for airplanes are fabricated, describes in detail various sections used on many modern planes, and outlines the physical properties of "Lucite" methyl methacrylate resin. E. I. du Pont de Nemours & Co., Inc.

A361. Solvamin-Rich in Riboflavin; booklet describes the characteristics of Solvamin and deals briefly with the importance of riboflavin in the human diet. The question and answer section should be of particular interest to food and pharmaceutical manufacturers. Commercial Solvents Corp.

A362. Water Marks; carries concise technical explanations of various methods of water treatment, with special reference to the reasons for increasing use of all-organic colloidals. Also contains short news items on solutions of water treatment problems in various industries, and notes on securing best results in operation of boilers, stills and evaporators. American K.A.T. Corp.

A363. Waterproofing Materials; describes various rubber base compounds designed to stop leaks or seepage through brick, concrete, stucco or other types of masonry. Primoid Products Corp.

Equipment—Containers

E586. Air Pumps; loose-leaf addition to Rotary Air Pump and Compressor Catalog contains data on augmented line, including new V-belt driven air pump. Gast Manufacturing Corp.

E587. Axial Flow Fans and Ventilating Equipment; describes and illustrates line of equipment. Includes ventilating terms and definitions, engineering data, charts and tables for calculation of ventilating systems. Propellair, Inc.

E588. Better Products—More Profitably Processed; brochure presents information about the use of colloid chemistry in processing industries. It also illustrates and describes various models of colloid mills and mixers. Premier Mill Corporation.

E589. Control Instruments, Bulletin No. Z5000; catalog designed to provide convenient, condensed listing of the principal items of equipment manufactured by the Company. Wheelco Instruments Co.

E590. Electric Equipment for Chemical Plants; Publication GED-978. Describes and illustrates electric equipment available for the chemical industry. Motors, motor control equipment, switchgear, power conversion equipment, and electric apparatus for material handling are discussed in detail, as well as voltage transforming equipment, voltage regulating equipment, power-factor improvement equipment, instruments, and automatic process timing switches. Installation information is given, and numbers of publications further describing each item are listed. General Electric Co.

E591. Hand Pumps; Bulletin No. 240-A. 4-page illustrated description of hand operated, high pressure pumps for testing purposes and for operating hydraulic jacks and other small hydraulic tools. The Watson-Stillman Co.

E592. High Frequency Powdered Iron Materials and Cores; information in loose-leaf form giving figures and curves of the electrical and mechanical characteristics of various high-frequency powdered iron materials and cores. Henry L. Crowley & Co., Inc.

E593. High-Voltage Starters, Publication GEA-3660; explains design, construction and application of the new 2300-volt contactor motor starter which can be safely applied to high capacity power circuits. General Electric Co.

E594. Ignitron Rectifiers; 40-page technical discussion of design, construction and operation covers the principles involved, rectifier circuits, and a description of the physical parts. Included in the construction details are vacuum-tight welded steel Ignitron tanks, anode and cathode assemblies, Ignitor and cooling system. Diagrams, graphs and photographs make the discussion easy to follow. Westinghouse Electric and Manufacturing Co.

E595. Indicating Instruments; 8-page catalog, No. C-10 describes the company's line of U-type and well-type manometers, draft gauges, flow meters, mercury pressure gauges, tank gauges and all accessories for accurately measuring pressures, vacuums and flows of liquids and gases. The Meriam Co.

E596. Priorities and the Dyestuff Industry; bulletin explaining the priority system and the manner in which it affects dyestuffs and their intermediates. Calco Chemical Division, American Cyanamid Co.

E597. Recording Photoelectric Spectrophotometer, GEA-3680; 8-page booklet gives detailed information on a device for the graphic measurement of color. General Electric Co.

E598. Resistance Thermometers, Catalog No. 9004; comprehensive presentation of the nature, design, performance and application of these thermometers in industrial processes, scientific work, refrigeration, air conditioning, etc. which involve the measurement and control of temperatures. Schematic diagram and explanation of the Wheatstone Bridge Circuit as applied to Brown Resistance Thermometers are included in the catalog. The Brown Instrument Co.

E599. Safety Steel Scaffolding; 8-page illustrated catalog gives details of Quik-Set Safety Steel Scaffolding for above floor painting, wiring, machine repair, etc. Mechanical Handling Systems, Inc.

E600. Tin and its Uses; October, 1941, No. 2. 16-page booklet containing following articles, "Tin Ridges on Tinplate," "Further Improvements in Tin Foil," "Restricting the Use of Tin," "Canned Foods in War-Time England," "New Tinning Oils," "Hot-Tinning 'Difficult' Mild Steels," "An Australian Test of Protective Films on Tinplate," "Tin in Printing Metals," "Thick Tin Coatings in the Food Industry." Tin Research Institute.

E601. Unaflow—Steam Driven Compressor; 8-page illustrated folder describes new compressor. Clark Brothers Co., Inc.

Women Workers in the Chemical Industry

(Continued from Page 97)

firms who require a medical examination either at the start of employment or under statutory regulations. There is no indication of any abnormal labour turnover with women. Women who leave usually do so during the first month of employment, and their treatment during this period will determine whether their introduction is successful or not.

Shifts and Working Hours

In most firms, including heavy chemicals, fine chemicals and dyestuffs, women work the same day work hours as men. A number of firms employ women on a two-shift system, but only in very few cases do they work on night shift. In most firms women work less overtime than men or no overtime at all. Short shifts have made possible the use of older women. Some firms give women a break in the middle of each shift. One firm reports they are commencing to introduce part-time women employees (i.e., less than eight hours), but there is need for further examination of this possibility.

Employers and unions, acting through the appropriate wage negotiation machinery for the industry, have agreed upon basic standard rates for women engaged on men's work. These are now in operation, and details may be obtained through the usual channels.

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New York City

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Title ....

Company ....

Address ....

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JACKETED KETTLES AND TANKS
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Index to Advertisers

Index to Advertisers

"We"—Editorially Speaking

William Chauncey Geer, author of "Elastomers In The Nation's War Program," is one of the country's outstanding authorities on rubber. He was born at Ogdensburg, N. Y., June 17, 1876, received his A.B. degree in 1902 and his Ph.D. in '05, both from Cornell. After a short period with the U. S. Forestry Service Dr. Geer joined the Goodrich organization and his rise was very rapid—chief chemist, director of development and finally a vice-presidency. The American rubber industry owes a tremendous debt of gratitude to Dr. Geer for he was indeed a pioneer in bringing to the industry a true scientific approach. His own technical contributions have been many and widely varied. Perhaps his work on the Vulcalock process for bonding rubber to metal is the most important, but he also obtained numerous patents on a host of subjects, among them tires, gas masks, hard rubber, and aqueous dispersions of rubber. In 1925 Dr. Geer moved to Ithaca, N. Y., and equipped a laboratory where he does research and maintains an independent consulting practice. Ever noted for his painstaking exactness in any project Dr. Geer has devoted considerable time to the preparation of this manuscript. We are certain that you will agree that it is an important as well as very timely contribution to the literature.

We extend our heartfelt sympathy to Mr. and Mrs. George F. Smith in their loss of a son, Robert Smith. He was attached to the *Utah* and was lost in the bombing of Pearl Harbor.

Attention OPM! Sound waves, such as those issuing from an automobile horn, will speed up distillation of liquids, according to a patent granted to Donald S. McKittrick and Robert E. Cornish (No. 2,265,762). Patent is assigned to the Shell Development Company. How about utilizing car horn noises to make gasoline?

Dr. J. Bjorksten, author of the article "The Chemistry of Duplication" is now chemical director of Quaker Chemical Products, Conshohocken, Pa. He was chief chemist of Ditto, Incorporated, for several years, and readers of this publication will recall his article "Recent Developments in Protein Chemistry" in the June number. Dr. Bjorksten was born in Finland in 1907, received his M.A. from The University of Helsingfors in '27 and his doctorate from the same institution in '31. He came to this country in the following year and soon joined the staff of Felton Chemical and in 1934 became chief chemist. He was later director of research of the Pepsodent Co., but only claims slight ethereal aquaintanceship with Amos and Andy. His present subject is particularly interesting in that very little appears in the literature on the chemistry of duplication.

Wider application of domestic farm products and wastes industrially is one development likely to receive tremendous impetus from our war status. Our four regional laboratories are expected to help tremendously in hastening this program and Dr. Henry G. Knight's brief but authoritative discussion is specially timely (Page 62). Dr. Knight who has been in complete charge of setting up these regional laboratories is widely known and beloved in scientific circles. He is not only a great chemist but an excellent story teller. At the dinner in Washington last May when he received the medal of the American Institute of Chemists the presentation was made by Vice-President of the United States, a close friend of Dr. Knight and his "boss" for many years when Mr. Wallace was Secretary of Agriculture.

Did you know that 1941 production of synthetic resins and cellulose plastics is expected to reach 450,000,000 pounds, to compare with but 312,000,000 in 1939?

Our congratulations to the chemical "peddlers" on the West Coast who have followed the example of the eastern boys in forming the Chemical Salesmen's Association of California. "Ed" Schuler, West Coast general branch manager for Monsanto is president of the group. "Ed" was very active in the Salesmen's Association of the American Chemical Industry when he was in his company's New York offices and, of course, knows all the tricks. Few probably realize that early in the history of the Salesmen's Association of the American Chemical Industry the idea of local chapters scattered around the country was seriously considered.

In the "New Chemicals for Industry" Section of the special November Exposition Issue and in the supplement containing the "New Chemicals for Industry" distributed from our booth at the Exposition at the Grand Central Palace last month the product Waxine Size 358-A was listed as being produced by Glyco Products. The manufacturer of this product is the American Cyanamid & Chemical Corporation and all inquiries for the material should be directed to Cyanamid's offices at 30 Rockefefller Plaza, New York, and not to Glyco.

Some of our readers we are sure will notice that the monthly feature "Between the Lines" does not in this issue carry the by-line of Kenneth Tator. Mr. Tator, an independent consulting chemical engineer with offices at Egypt, Mass., has accepted a call for service with the OPM. Although Mr. Tator's series is a relatively new one it was a particularly popular one with our readers. The members of the staff will continue it indefinitely and we sincerely hope that Messrs. Hitler, Mussolini, and Togo are properly put in their places quickly so that Mr. Tator can be back again with us in "Between the Lines."

And may we remind you once more that if you or your company has yet to send in a contribution to the Chemists' Club Library fund that you do it now while it is on your mind? It is really an industry affair to see that the library is maintained properly for where else can you turn and find such complete facilities? Harry B. McClure, chairman of the Library Committee, and his co-workers have done a wonderful job. Of course, too, great credit properly goes to Miss Fell, the librarian in charge.

Fifteen Years Ago

From Our Files of January, 1927

William B. Thom elected President, Westvaco Chlorine Products.

Henry Pfaltz of Pfaltz & Bauer retires.

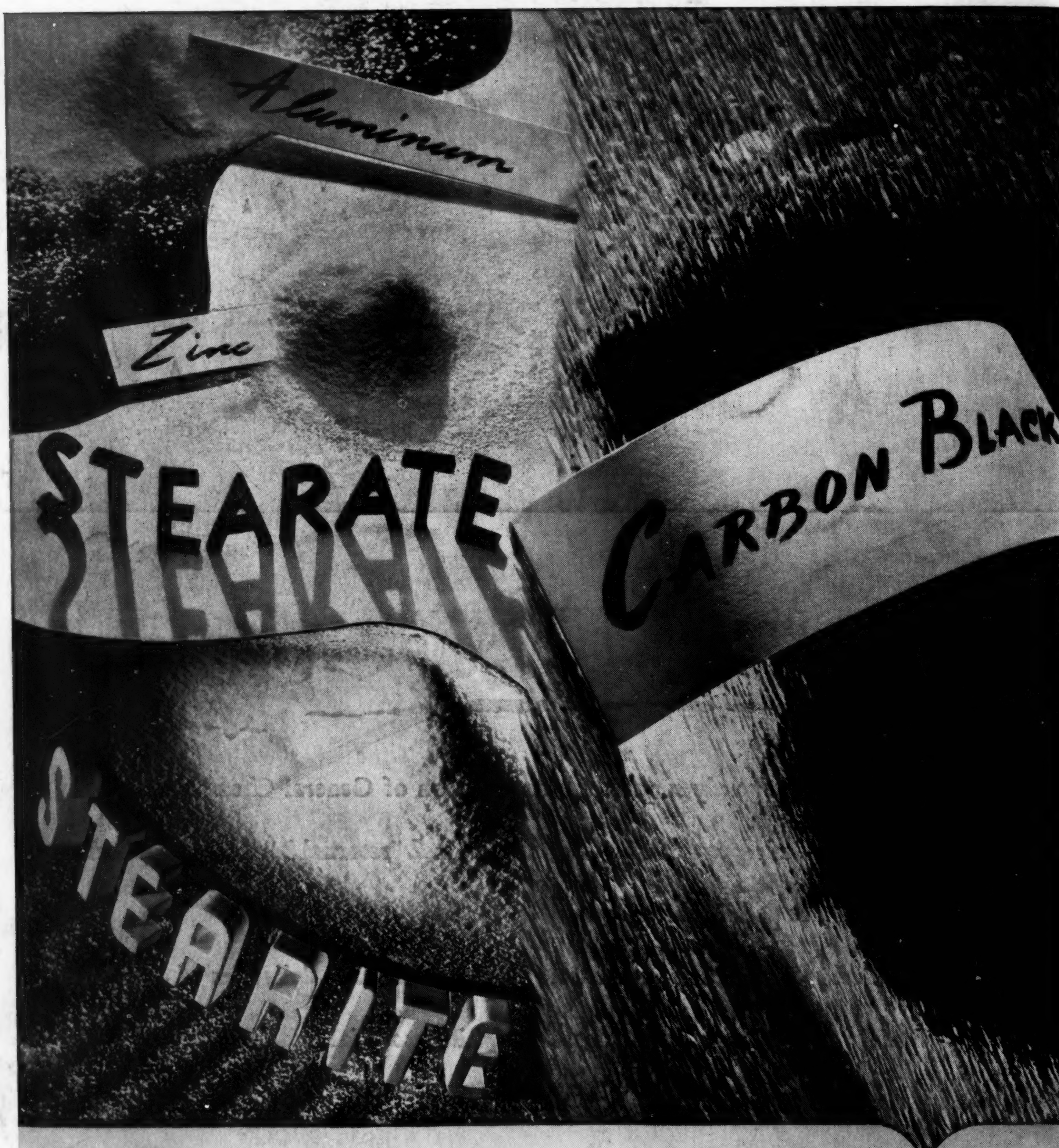
Dr. John E. Teeple receives the Perkin Medal.

American Cyanamid makes new bid for Muscle Shoals.

Arthur D. Little, Inc., celebrates its 40th birthday.

Dr. Charles L. Parsons, Secretary of the A. C. S., and Dr. Harrison E. Howe, Editor, Industrial & Engineering Chemistry, receive the Order of Officer of the Crown of Italy from the King of Italy. Editorial note: How times have changed!

Charles A. Mace, Sales Manager, Tower Manufacturing, Newark, N. J. accepts secretaryship of the S. O. C. M. A.


Aluminum
Zinc
STEARATE
CARBON BLACK
STEARITE

State of Chemical Trade

Current Statistics (December 31, 1941)—p. 96

WEEKLY STATISTICS OF BUSINESS

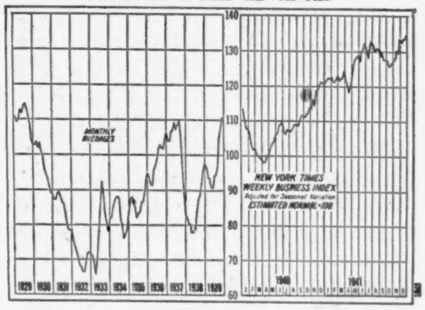
Week Ending	Carloadings 1941	Carloadings 1940	Carloadings % of Change	Electrical Output* 1941	Electrical Output* 1940	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Chem. & Drugs	Fertilizer Fats & Oils	Ass'n Price Indices Fert. Mat.	Ass'n Price Indices Mixed Fert.	Ass'n Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Dec. 6	833,375	738,513	+12.8	3,414,844	2,975,704	+14.8	95.8	112.0	124.4	114.8	109.8	117.2	89.7	97.6	134.1	99.2
Dec. 13	807,225	736,340	+ 9.6	3,475,919	3,003,543	+15.7	97.8	112.0	129.0	114.9	109.8	119.1	91.5	97.5	134.6	100.1
Dec. 20	798,697	697,755	+14.5	3,495,140	3,052,419	+14.5	97.5	112.0	126.2	115.5	119.7	119.2	91.7	97.9	135.2	100.9
Dec. 27	606,526	545,307	+11.2	3,234,128	2,757,259	+17.3	97.6	113.6	122.7	115.4	119.7	119.5	91.7	93.4	136.9	101.1

MONTHLY STATISTICS

CHEMICAL:	Nov. 1941	Nov. 1940	Oct. 1941	Oct. 1940	Sept. 1941	Sept. 1940
Acid, sulfuric **(expressed as 50° Baumé, short tons, Bureau of the Census)**						
Total prod. by fert. mfrs.	......	......	......	......	......	222,476
Consumpt. in mfr. fert.	......	......	......	......	......	169,878
Stocks end of month	......	......	......	......	......	105,557
Alcohol, Industrial **(Bureau Internal Revenue)**						
Ethyl alcohol prod., proof gal..	......	......	......	......	35,756,991	21,559,240
Comp. denat. prod., wine gal...	......	......	......	......	2,679,913	3,093,302
Removed, wine gal.	......	......	......	......	2,706,534	3,097,748
Stocks end of mo., wine gal...	......	......	......	......	370,401	742,332
Spec. denat. prod., wine gal. ...	......	......	......	......	14,228,475	10,600,396
Removed, wine gal.	......	......	......	......	14,393,773	11,059,056
Stocks end of mo., wine gal...	......	......	......	......	470,952	1,707,217
Ammonia sulfate prod., tons *a*..	61,359	62,934	63,372.9	63,898	61,675.8	62,573
Benzol prod., gal. *b*	12,037,199	11,886,000	12,435,830	12,218,000	11,177,395	11,077,000
Byproduct coke, prod., tons *a*..	4,833,483	4,763,500	4,970,652	4,853,600	4,805,793	4,640,700
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	......	......	......	......	982,817	736,372
Sheets, ship., lbs.	......	......	......	......	1,022,014	745,068
Rods, prod., lbs.	......	......	......	......	334,579	256,678
Rods, ship., lbs.	......	......	......	......	410,546	282,714
Tubes, prod., lbs.	......	......	......	......	161,655	100,236
Tubes, ship., lbs.	......	......	......	......	132,549	85,636
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	......	......	......	......	585,441	826,248
Shipments, lbs.	......	......	......	......	621,557	754,786
Molding comp., ship.; lbs. ...	......	......	......	......	2,813,225	1,501,463
Methanol (Bureau of the Census)						
Production, crude, gals.	......	......	......	......	......	407,764
Production, synthetic, gals.	......	......	......	......	......	3,787,794
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	4,072,081	3,318,461	4,285,874	3,303,892	4,600,150	2,698,218
Heavy goods, ship., linear yds..	2,900,534	2,457,154	3,532,725	2,538,265	3,199,908	2,408,096
Pyroxylin spreads, lbs. *c*	6,522,824	5,775,919	7,488,494	5,851,135	7,097,098	5,127,772
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	......	......	......	......	$23,461	$20,000
Crude sulfur *d*	......	......	......	......	$1,374	$874
Coal-tar chemicals *d*	......	......	......	......	$2,331	$1,114
Industrial chemicals *d*	......	......	......	......	$4,607	$4,152
Imports						
Chemicals and related prod. *d*..	......	......	......	......	$5,892	$11,338
Coal-tar chemicals *d*	......	......	......	......	$901	$1,494
Industrial chemicals *d*	......	......	......	......	$1,245	$1,254
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	......	......	148.5	125.4	146.1	123.0
Other than petroleum	......	......	153.4	126.5	150.5	123.1
Chemicals	......	......	182.7	145.6	182.2	143.4
Explosives	......	......	......	......	Not Available	
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	......	......	190.7	139.3	186.4	138.1
Other than petroleum	......	......	199.2	140.2	192.0	137.8
Chemicals	......	......	257.6	176.2	250.4	170.9
Explosives	......	......	Not Available		Not Available	
Price index chemicals*	88.3	85.1	88.4	85.0	88.2	84.8
Drugs & Pharmaceuticals* ...	123.2	95.9	124.1	95.8	104.4	96.2
Fert. mat.*	77.3	69.9	77.3	68.1	76.6	68.0
Paint and paint mat.	95.3	85.7	96.0	84.8	94.7	84.2
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	......	......	136,503	145,902
Total phosphate rock	......	......	......	......	84,377	82,336
Total potash fertilizers	......	......	......	......	14,205	12,552
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	......	......	102,601	68,128
Sodium nitrate	......	......	......	......	60,352	37,610
Total potash fertilizer	......	......	......	......	5,313	7,787

INDUSTRIAL TRENDS

BUSINESS INDEX ADVANCES



Business: Activity was maintained at high levels during November and December in spite of rather drastic curtailment of durable consumer goods. Volume of industrial output as indicated by the Federal Reserve Board was estimated at about 169% of the 1935-39 level. This represents a two point gain over November 1941 and a 52 point gain over May 1940 when our armament program got under way. The **New York Times** index of business activity has continued its weekly gains and for week ending January 3 had reached 137.3, the highest in its history.

Steel: The steel industry operated at about 98% of capacity December and produced 7,163,999 net tons. The scrap shortage is still a pressing problem and is expected to force a decline in the operating rate.

According to the American Iron and Steel Institute the industry produced 82,927,557 tons during 1941. This represents a 25% increase over the previous record set in 1940. The 1941 tonnage exceeds the peak World War 1 output in 1917 by 65%.

During 1941, the industry operated at a rate of 97.4% of capacity as compared with 82.1% during 1940 and 90.8% during 1917.

Carloadings: Carloadings during December averaged about 12% better than similar period last year. The total loadings for 1941 amounted to 42,284,927 cars, an increase of 16.3% over the previous year and 24.7% better than 1939.

Measured in revenue ton-miles, the railroad movement set a new record in 1941. Approximately 470 billion ton-miles were scored by the carriers last year, an increase of 5.1% over 1929, the previous record year.

State of Chemical Trade
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State of Chemical Trade

Current Statistics (December 31, 1941)—p. 97

Electric Output: Production of electrical power in the United States during the month of December averaged about 15.5% better than the comparable period of 1940. A three point plan as follows has recently been decided upon for increasing supply of power. (1) Construction of transmission lines to link the steam generating facilities of the North and North Central areas with the hydroelectric facilities of the Southeast. (2) Expansion of facilities of at least one of the companies which produces generating equipment. (3) Conversion of some of the automobile industry's machinery to production of generating equipment.

Automotive: Automotive industry's output in 1941 was the second best on record in spite of the progressive curtailment of passenger automobiles. The reason for the high output of course was the tremendous increase in sales of trucks and other military equipment. Factory sales for the year are estimated at 4,820,000 passenger cars and trucks. On January 1 sales of automobiles were banned. Shortly afterward it was announced that a quota of 204,848 passenger cars would be allowed for January and after that production would practically cease. The industry will rapidly assume the major burden for armament production.

Construction: According to the F. W. Dodge Corporation the value of construction contract awards for November declined sharply from high level of other recent months. Awards for privately financed construction decreased more than seasonally and contracts for publicly-financed projects declined following continued large awards for the previous months of the year.

Commodity Prices: Price indexes have continued to rise. After the U. S. entry into the war, prices of grains, livestock, and foods rose sharply. Prices of most industrial materials, being limited by government regulation, showed little change. Further measures taken to control advances were announced for wool, shellac, and imported products such as cocoa, coffee, pepper, and fats and oils.

Outlook: The President, in his report to Congress has given us the outlook. Industrial production will be continually stepped up throughout the year. For a few months, more drastic conversion of industry to full time war basis may cause difficulties. Some temporary unemployment will probably exist. Raw materials controls will be more stringent and bring serious problems to many plants unless they can divert their production facilities to more direct cooperation in our war program.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	Nov. 1941	Nov. 1940	Oct. 1941	Oct. 1940	Sept. 1941	Sept. 1940
Superphosphate e (Nat. Fert. Association)						
Production, total	......	......	......	......	330,688	278,103
Shipments, total	......	......	......	......	385,647	371,539
Northern area	......	......	......	......	288,090	292,234
Southern area	......	......	......	......	97,557	79,305
Stocks, end of month, total	......	......	......	......	1,274,197	1,275,841
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	......	......	......	......	204,039	242,844
Total, 12 southern	......	......	......	......	135,239	142,636
Total, 5 midwest	......	......	......	......	68,800	100,208
Fertilizer employment *i*	......	......	103.6	96.7	110.2	95.6
Fertilizer payrolls *i*	......	......	101.9	82.4	111.6	85.4
Value imports, fert. and mat. *d*	......	......	......	......	$2,435	$1,311
GENERAL:						
Acceptances outst'd'g *f*	$193	$196	$184	$186	$176	$176
Coal prod., anthracite, tons	3,832,000	3,980,000	5,382,000	4,355,000	5,143,000	4,053,000
Coal prod., bituminous, tons	42,865,000	40,012,000	49,800,000	38,700,000	46,880,000	38,413,000
Com. paper outst'd'g *f*	$387	$231	$377	$252	$370	$250
Failures, Dun & Bradstreet	842	1,086	809	1,111	735	976
Factory payrolls *i*	165.5	125.1	166.7	116.2	163.0	111.6
Factory employment *i*	134.1	114.2	132.5	111.4	132.4	111.4
Merchandise imports *d*	......	......	......	......	$262,680	$194,928
Merchandise exports *d*	......	......	......	......	$406,057	$288,270
GENERAL MANUFACTURING:						
Automotive production	352,347	256,101	382,000	493,223	234,255	269,108
Boot and Shoe prod., pairs	34,701,613	36,565,529	45,246,238	37,027,350	43,375,891	35,092,360
Bldg. contracts, Dodge *j*	......	......	606,349	383,069	623,292	347,651
Newsprint prod., U. S. tons	......	......	......	......	78,657	77,888
Newsprint prod., Canada, tons.	......	......	......	......	298,276	282,322
Glass containers, gross‡	......	......	......	......	6,286	4,289
Plate glass prod., sq. ft.	......	......	......	......	1,123,200	1,002,000
Window glass prod., boxes	......	......	......	......	14,905,000	14,090,800
Steel ingot prod., tons	6,969,987	6,469,107	96.4	90.6	6,819,706	6,056,246
% steel capacity	98.3	96.6	99.0	96.1	7,242,683	6,644,542
Pig iron prod., tons	4,702,927	4,403,230	4,856,306	4,445,961	4,716,901	4,176,527
U.S. cons'pt. crude rub., lg. tons	......	......	60,418	59,644	53,655	52,469
Tire shipments	4,047,913	4,968,533	5,867,175	5,525,075	5,264,357	4,462,486
Tire production	3,964,067	4,731,995	4,834,308	5,076,951	4,583,324	4,412,574
Tire inventories	4,042,995	9,162,995	4,122,836	9,409,683	5,170,008	9,837,395
Cotton consumpt., bales	......	......	953,600	770,832	875,682	770,702
Cotton spindles oper.	23,069,146	22,685,622	23,043,310	22,456,588	22,963,944	22,281,476
Wool consumption *s*	......	......	60.6	45.9	58.6	38.3
Rayon deliv., lbs.	......	......	......	......	37,000,000	30,900,000
Rayon employment *i*	......	......	326.4	311.1	327.0	311.7
Rayon payrolls *i*	......	......	375.5	322.6	374.3	327.7
Soap employment *i*	......	......	100.2	88.8	98.2	87.9
Soap payrolls *i*	......	......	143.5	107.2	139.6	107.0
Paper and pulp employment *i*	......	......	128.0	115.1	128.3	116.7
Paper and pulp payrolls *i*	......	......	164.4	*123.8	163.0	124.2
Leather employment *i*	......	......	96.5	81.6	97.0	79.0
Leather payrolls *i*	......	......	114.5	81.6	114.2	76.8
Glass employment *i*	......	......	133.2	113.2	130.3	109.3
Glass payrolls *i*	......	......	176.0	129.8	161.0	120.7
Rubber prod. employment *i*	......	......	111.6	92.6	111.5	89.4
Rubber prod. payrolls *i*	......	......	135.8	99.5	134.2	95.7
Dyeing and fin. employment *i*	......	......	133.8	128.6	136.0	124.8
Dyeing and fin. payrolls *i*	......	......	134.3	111.4	135.7	106.5
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)[1]	......	......	140.9	48.6	142.5	49.3
Gasoline prod., *p*	......	......	63,288	52,907	60,167	52,313
Cottonseed oil consumpt., bbls.	......	......	297,353	317,548	297,635	292,553
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments, dollars	$41,367,698	$31,892,256	$51,138,488	$39,179,174	$50,363,488	$35,327,356
Trade sales (580 estbts.) dollars	$18,804,182	$15,115,083	$24,724,475	$19,638,441	$25,624,958	$18,416,711
Industrial sales, total, dollars	$18,726,637	$14,048,944	$21,453,628	$15,953,121	$19,709,134	$13,458,969
Paint & Varnish, employ. *i*	......	......	144.0	125.1	143.9	126.1
Paint & Varnish, payrolls *i*	......	......	173.5	135.8	169.9	135.6

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 Census totals; *j* 000 omitted. 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census, in millions of lbs.; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940; [1] Revised series beginning February, 1940.

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Six Months Earnings of Dow Placed at $4,052,370

The consolidated net income of The Dow Chemical Company and subsidiaries for the six months ended November 30, 1941 was $4,052,370.30, which, after providing for dividends on the outstanding preferred stock, was equivalent to $3.12 per share on the common stock outstanding at November 30, 1941. The net income was after providing $3,139,206.36 for Federal normal income taxes, surtaxes, and excess profits taxes at an effective rate of tax computed upon the basis of estimated taxable income for the Company's fiscal year ending May 31, 1942.

In like period of preceding fiscal year, net profit of $3,585,015 was reported, equal to $3.02 a share on 1,135,187 common shares.

Included in income for the six months ended November 30, 1941 were dividends of $750,000.00 received from an associated company. During the period, $1,226,067.41 was charged against income for the amortization of completed emergency plant facilities covered by certificates of necessity, the costs of which are being amortized over a period of sixty months as permitted for Federal income and excess profits tax purposes.

Chemical Incomes Best on Record

Earnings of the chemical industry in the third quarter of 1941 showed continued increase, despite the considerable step-up in taxation. Twenty-one companies comprising the major part of the industry together earned $47,881,913, against $42,784,485 a year ago, an increase of 11.9 per cent.

In the second quarter net profit of $50,188,888 was 10.6 per cent ahead of the 1940 figure of $45,386,229, while in the first quarter net profit of $46,701,426 was 2.4 per cent below the $47,843,128 earned in the first period of 1940.

It is worthy of note, however, that a large part of the taxes provided for out of third-quarter earnings actually were applicable to the earlier periods of the year, hence the decline in earnings between the second and third quarters in each year reflected unequal tax distribution and not diminishing earning power.

For nine months the twenty-one companies earned $143,886,877, against $136,632,710 in the same period of last year, a gain of 5.3 per cent.

The 1941 earnings are the best for the period on record, even exceeding 1929, owing to the persistent and rapid growth of the chemical industry during the depression years and the large amount of national defense business obtained in the last two years. The best quarterly earnings on record, however, were $62,600,277 in the final quarter of 1939, which is considered to have been mainly a reflection of the forehanded buying of consuming industries here and by British and French interests immediately after the outbreak of war in Europe.

Earnings for the first nine months of 1939 were $112,214,572 and for the first nine months of 1938 they totaled $66,132,224.

In order to obtain a better picture of the effect of mounting taxes on earnings this year, the reports of fourteen members of the industry that give tax comparisons are reviewed separately, with deductions of du Pont's income from General Motors made to show results directly attributable to the chemical industry itself.

Combined net earnings of the fourteen companies before Federal income and excess profits taxes and contingency reserves for the first nine months of 1941 amounted to $184,366,340, against $107,385,172 in the 1940 period, an increase of 71.7 per cent.

The tax and contingency provisions for the nine months were $114,862,949, or 62.3 per cent of earnings, comparing with $42,225,021, or 39.3 per cent of earnings, in the first nine months of 1940. The increase was 172 per cent.

Net income after taxes and contingency provisions of the fourteen companies was $69,503,391, against $65,160,151 in nine months of 1940, a gain of 6.66 per cent.

Dividends and Dates

Name	*Per Share*	*Stock Record*	*Payable*
Abbott Laboratories, new 4% pref. (initial div. for partial quar.) ending Jan. 15 ..	3%	1-2	1-15
Air Reduction Co. (quar.)	.25	12-31	1-15
Extra	.25	1-15	12-31
Chemical Fund, Inc. (quar.)	.15	12-31	1-15
Corn Products Refining Co. com. (quar.)	.75	1-2	1-20
7% pref. (quar.)	1.75	1-2	1-15
E. I. du Pont de Nemours $4.50 pref. (quar.)	1.125	1-9	1-24
General Electric Co. (year end)	.35	12-26	1-24
Hercules Powder Co. 6% pref. (quar.)	1.50	2-2	2-13
International Nickel Co. of Canada 7% pref. (quar.) payable in U. S. funds	1.75	1-3	2-2
7% pref. ($5 par) (quar.) payable in U. S. funds ..	.0875	1-3	2-2
U. S. Industrial Alcohol (quar.)	.25	12-31	2-2
Extra	.25	12-31	2-2
U. S. Smelting, Refining & Mining Co., com.	1.00	12-16	1-15
7% pref. (quar.)	.875	12-22	1-15

Earnings Statements Summarized

Company		Annual dividends	Net income 1941	Net income 1940	Common share earnings 1941	Common share earnings 1940	Surplus after dividends 1941	Surplus after dividends 1940
Armour & Co. of Illinois & subs.: Year, November 1	f	...	$15,111,410	$8,307,429	$1.95	$ .26	......	......
Celotex Corp.: Year, October 31	y	$1.12½	1,749,099	747,628	2.51	.94	$897,599	......
Dow Chemical Co.: Six months, Nov. 30 ...	y	3.00	4,052,370	3,585,015	3.12	3.02	......	......
Firestone Tire & Rubber Co.: Year, October 31	y	1.50	11,262,428	8,652,607	4.37	3.02	6,063,545	3,927,600
Glidden Co.: Year, October 31	y	1.50	3,010,390	1,727,829	h3.08	h1.56	1,417,222	373,791
Lee Rubber & Tire Corp.: Year, October 31		2.25	1,482,954	981,887	h6.14	h3.66	919,433	378,115
Squibb (E. R.) & Sons.: September 30 quarter ..	y	1.62½	520,236	396,477	.95	.68	......	......
United Gas Corp.: Twelve months, Nov. 30	f	...	6,146,081	5,733,689	s3.39	s2.92	L	......
Westinghouse Elec. & Mfg.: Eleven months, Nov. 30	y	5.00	19,619,813	17,492,642	h6.12	h6.54	......	......
West Virginia Pulp & Paper Co.: Year, October 31	y	1.90	4,270,312	3,670,621	3.70	3.03	1,710,954	1,833,209

a On Class A shares; b On Class B shares; c On Combined Class A and Class B shares; d Deficit. f No common dividend; j On average number of shares; k For the year 1940; b On Preferred stock; On Class A shares; y Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; n Preliminary statement; h On shares outstanding at close of respective periods. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss. * Not available. ¶¶ Before interest on income notes. s Paid on or declared in last 12 months plus extra stock. w Last dividend declared, period not announced by company.

Price Trend of Representative Chemical Company Stocks

	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Net gain or loss last mo.	Price on Dec. 28 1940	1941 High	1941 Low
Air Reduction Co	38¼	37¼	37⅜	36⅛	— 2⅛	40⅛	45	34⅝
Allied Chemical & Dye	150	141¾	139¼	140	—10	163	167½	135¼
Amer. Agric. Chem.	22⅞	21½	21	21½	— 1⅜	15⅛	22⅞	14⅝
Amer. Cyanamid "B"	38⅝	38¾	39⅛	41	+ 2⅜	37¼	42⅜	31
Columbian Carbon	78	71	70	66¾	— 3¼	75¾	83	64
Commercial Solvents	9⅛	8⅜	8	7⅞	— 1¼	10⅝	11⅞	7½
Dow Chemical Co.	125½	124	121⅝	123	— 2½	137½	141¾	111⅛
du Pont	144	144¾	139½	140½	— 3½	165⅞	164¾	136¼
Hercules Powder	67⅝	69½	70	69	+ 1⅜	70⅝	80¼	65¼
Mathieson Alkali Works	27⅝	26½	26¾	26¼	— 1⅜	27	31¼	24⅛
Monsanto	89½	91⅝	88¾	87½	— 2	83	94	77
Standard Oil of N. J.	46⅝	44½	42⅜	42	— 4⅝	33½	46⅞	33
Texas Gulf Sulphur	34¼	31¼	30⅝	31½	— 2¾	36	38⅞	30⅛
Union Carbide & Carbon	74	70¾	69½	69¾	— 4¼	69	79⅞	60
United Carbon Co.	43⅛	37¾	37¼	36	— 7⅛	...	52	35
U. S. Industrial Alcohol	31¼	29	29½	29	— 2¼	24⅛	33½	20

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Chemical Stocks and Bonds

PRICE RANGE December 1941 Last	December 1941 High	December 1941 Low	1940 High	1940 Low	1939 High	1939 Low	Sales No. of shares 1941	Stocks	Par $	Shares Listed	Dividends 1941*	Earnings** $-per-share-$ 1940	1939	1938
NEW YORK STOCK EXCHANGE														
46⅞	55¾	46	70¼	49¼	71½	53	39,900	Abbott Labs.	No	755,204	1.60	2.89	2.61	2.43
36⅝	45	34⅝	58⅛	36½	68	45¼	332,000	Air Reduction	No	2,711,137	1.00	2.38	1.98	1.47
144½	167½	135¼	182	135½	200½	151½	107,600	Allied Chem. & Dye	No	2,401,288	6.00	9.43	9.50	5.92
20½	22⅞	14⅜	21	12⅛	24½	16	81,200	Amer. Agric. Chem.	No	627,981	1.20	1.45	1.22	2.23
8	9⅞	4⅝	8¼	4⅛	11⅞	5½	91,900	Amer. Com. Alcohol	No	280,934	...	.22	—.38	—2.05
33¼	33⅞	26	35½	23	37	21	24,800	Archer-Dan.-Midland	No	545,416	1.85	5.71	3.82	.43
69	72¼	61	80½	57	71	50	14,000	Atlas Powder Co.	No	252,278	4.50	5.71	3.82	2.69
113	121	111	124¾	112½	127	116	2,650	5% conv. cum. pfd.	100	68,597	5.00	26.01	18.94	14.77
20⅞	29¾	18½	35½	20	30¼	13⅝	240,000	Celanese Corp. Amer.	No	1,112,788	2.00	3.38	3.53	.20
119¾	122⅛	116¾	121	105½	109⅞	84	16,670	prior pfd.	100	164,818	7.00	38.69	38.67	15.05
12½	16¼	10⅞	20	10⅛	18	11½	204,000	Colgate-Palm.-Peet	No	1,962,087	0.50	1.72	2.74	1.77
64¾	83	64	98¾	71	96	73	25,000	Columbian Carbon	No	537,406	4.70	5.71	5.32	5.13
8⅜	11⅞	8⅜	16⅝	8	16	8⅝	452,800	Commercial Solvents	No	2,636,878	0.55	.91	.61	—.11
54	54	42¼	65⅛	40¼	67½	54⅞	214,800	Corn Products	25	2,530,000	3.00	3.10	3.32	3.18
175	182½	170	184	165	177	150	8,270	7% cum. pfd.	100	245,738	7.00	7.23	7.70	3.74
12⅞	20¼	12¼	23¼	12½	32⅜	18	32,170	Devoe & Rayn. A.	No	95,000	1.00	1.14	2.08	—1.72
123	141¾	111⅛	171	127¼	144⅝	101½	143,900	Dow Chemical	No	1,135,187	3.00	6.65	3.76	3.91
143	164¾	136¼	189¼	146½	188½	126¼	339,000	DuPont de Nemours	20	11,065,762	7.00	7.23	7.70	3.74
124¾	127	120⅞	129⅜	114	124⅛	112	29,200	4½% pfd.	No	1,688,850	4.50	51.48	52.25	87.27
138	145½	120¼	166¾	117	186⅛	138⅛	124,600	Eastman Kodak	No	2,488,242	6.00	7.96	8.55	7.54
176	182½	160	180	155	183½	155½	2,630	6% cum.	100	61,657	6.00	325.62	337.65	281.22
38	41	32½	39¼	24¾	36	18¼	119,500	Freeport Sulphur	10	796,380	2.00	3.81	2.76	1.87
5	7½	4⅞	10	5½	10⅞	7	63,600	Gen. Printing Ink	1	735,960	0.65	.86	.94	.62
12	17⅞	11	19¾	11	24½	14	120,800	Glidden Co.	No	829,989	1.50	1.56	1.70	—.29
37¾	46	35	45	30	47	34	13,300	4½% cum. pfd.	50	199,940	2.25	8.64	9.27	1.03
91	96	76	113¼	89⅞	112¼	93	14,300	Hazel Atlas	25	434,409	5.00	5.98	6.60	4.97
70¾	80¼	65¼	100½	69	101½	63	66,800	Hercules Powder	No	1,316,710	3.00	4.01	3.65	1.95
127½	132½	123½	133½	126¼	135½	128½	2,390	6% cum. pfd.	100	96,194	6.00	66.38	60.87	35.31
24⅝	29⅞	20¾	29	16⅜	29½	16¾	84,100	Industrial Rayon	No	759,325	2.50	3.51	1.77	.24
22⅜	27	19	47⅜	21¼	46¼	17½	36,400	Interchem.	No	290,320	1.60	2.47	4.10	.32
109½	113¼	107	113	91	109½	90	4,640	6% pfd.	100	65,661	6.00	16.99	24.27	7.39
1½	2⅛	1	2½	1	3⅝	1½	56,200	Intern. Min. & Ch.	No	436,048	...	—1.57	—1.32	—0.003
51	51	30⅛	44	18⅛	41	16	44,600	7% cum. pfd.	100	100,000	...	.14	1.26	7.01
26⅞	31⅜	23	38⅞	19⅜	55¾	35	1,019,800	Intern. Nickel	No	14,584,025	2.00	2.30	2.39	2.09
45	49	38¼	39⅝	26⅞	38	29	12,700	Intern. Salt	No	240,000	3.00	3.98	1.92	2.29
18¼	22	17¼	23¾	14⅜	22½	14½	14,300	Kellogg (Spencer)	No	509,213	1.70	...	1.39	.71
21⅝	45⅜	19⅛	53⅜	30	56¾	36½	312,200	Libbey Owens Ford	No	2,513,258	3.50	3.97	3.21	1.57
14⅞	16⅝	13	18⅜	10⅛	19	13½	82,600	Liquid Carbonic	No	700,000	1.00	1.72	1.62	1.81
27¼	31¼	24⅛	32¾	21	37⅜	20¾	61,000	Mathieson Alkali	No	828,171	1.50	1.72	1.12	1.01
88⅝	94	77	119	79	114¾	20¾	95,800	Monsanto Chem.	No	1,241,816	3.00	4.04	3.81	2.35
116	118½	112	119	110	121	110	2,700	4½% pfd. A.	No	50,000	4.50	57.38	54.29	31.51
117¾	123	115	122	113½	122½	112	2,850	4½% pfd. B.	No	50,000	4.50	57.38	54.29	31.51
110	113½	108⅞	...	...	...	...	2,420	4½% pfd. C.	No	50,000	4.50	...	...	...
13⅛	19¼	12¼	22½	14⅛	27½	17⅞	304,100	National Lead	10	3,095,100	0.50	1.34	1.23	.75
160½	176	160½	176	160	173⅛	152	4,800	7% cum. "A" pfd.	100	213,793	7.00	28.54	27.04	20.03
144	154	138	153¾	132	145	132	3,200	6% cum. "B" pfd.	100	103,277	6.00	59.46	55.30	35.97
32½	36	26	44	28¾	46	28½	27,900	National Oil Products	4	179,829	1.95	3.92	3.89	2.23
8¼	11⅞	5⅜	14¼	6⅛	17¾	8½	273,300	Newport Industries	1	621,359	0.75	0.50	0.66	—0.08
52¼	52⅝	38¾	64⅝	42	70	50	222,400	Owens-Illinois Glass	12.50	2,661,204	2.50	2.71	3.17	2.02
51⅝	61½	50	71¾	53	66	50⅝	209,100	Procter & Gamble	No	6,409,418	2.00	4.37	3.80	2.50
115⅜	120	115	118½	112½	119¾	112	13,870	5% pfd.	100	169,517	5.00	336.78	298.55	101.81
14½	16¾	10⅛	13⅛	7⅝	17¼	9⅞	261,700	Shell Union Oil	No	13,070,625	1.00	1.05	0.77	0.70
28½	35¼	18⅞	23¼	12¼	29½	15½	1,444,000	Skelly Oil	No	981,349	1.50	3.28	1.99	2.27
26⅜	34⅛	25½	29	20¾	30	22¾	789,200	S. O. Indiana	25	15,272,020	1.00	2.20	2.24	1.82
41¾	46⅞	33	46½	29⅞	53½	38	1,585,400	S. O. New Jersey	25	27,278,666	1.00	4.54	3.27	2.86
8¼	9⅜	6	9¼	4¼	9⅛	4	97,900	Tenn. Corp.	5	853,696	1.00	1.36	0.41	0.40
39½	46⅜	34½	47⅝	33	50¾	32½	739,900	Texas Corp.	25	10,876,882	2.00	2.90	3.02	2.13
33¾	38⅞	30⅛	37¼	26⅞	38½	26	195,700	Texas Gulf Sulphur	No	3,840,000	2.00	2.38	2.04	1.81
74	79⅞	60	88⅜	59⅞	94¼	65½	557,300	Union Carbide & Carbon	No	9,277,288	3.00	4.55	3.86	2.77
36¾	52	35	65⅝	42½	69½	52	44,200	United Carbon	No	397,885	3.00	3.36	3.81	3.78
29¾	33½	20	28	14	29¾	13½	149,000	U. S. Indus. Alcohol	No	391,238	1.00	2.73	1.06	—1.08
19	34⅛	15½	43⅞	25	40	16	161,200	Vanadium Corp. Amer.	No	425,708	1.50	2.85	3.25	0.61
24⅝	27¼	20	31½	14	33¾	17	39,700	Victor Chem.	5	696,000	1.40	1.45	1.59	1.05
1⅛	2½	¾	4⅛	1¾	5¾	2½	53,000	Virginia-Caro. Chem.	No	486,122	...	—1.36	—1.57	—1.80
22¼	28¾	18⅞	31¾	14	33¾	17	48,500	6% cum. part. pfd.	100	213,052	1.00	2.89	2.41	1.90
31	36½	27¼	38½	27¾	39¼	15¼	18,400	Westvaco Chlorine	No	353,152	1.85	2.96	2.91	1.52
106	112	105	109⅞	108	...	...	6,740	cum. pfd.	No	59,885	4.50	21.98	...	...
NEW YORK STOCK EXCHANGE														
40¾	42⅜	31	39⅞	26	35¾	18⅜	345,950	Amer. Cyanamid "B"	10	2,618,387	0.60	2.44	2.07	0.91
7	7¾	6⅜	8⅛	5	9¼	5	14,500	Duval Texas Sulphur	No	500,000	1.25	1.16	1.25	0.71
88½	99	65	92	60	68	30	7,925	Heyden Chem. Corp.	100	125,497	3.00	6.26	5.98	2.07
57	96¼	55	104	65	117	90	98,200	Pittsburgh Plate Glass	25	2,188,040	5.00	6.30	4.94	3.00
61	84	61	100	62½	113½	81	64,950	Sherwin Williams	25	638,927	3.00	6.57	5.96	2.43
111¾	115½	108½	114¾	106	116	106½	3,970	5% cum. pfd.	50	122,289	5.00	39.49	35.08	8.76
PHILADELPHIA STOCK EXCHANGE														
174½	185	162	192	158¾	179	135	3,700	Pennsylvania Salt	50	150,000	8.00	...	10.52	6.29

PRICE RANGE December 1941 Last	December 1941 High	December 1941 Low	1940 High	1940 Low	1939 High	1939 Low	Sales 1941	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE												
103⅛	104½	100¾	105¼	100⅛	103¾	98	3,306,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
39	42¼	26⅛	41	27½	41½	19	558,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
36	40	25⅜	39¾	27	37	21½	1,530,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
96¾	99⅞	94¾	100¼	93½	95¾	88¾	4,735,000	Shell Union Oil	1954	2½	J-J	85,000,000
104½	106¾	102½	107	101⅛	106¼	97⅞	2,083,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
104⅛	105⅝	103	107	100⅝	106½	94¼	2,049,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
104⅝	107¾	102⅞	108¼	102	105⅞	95¼	1,592,000	Texas Corp.	1959	3	A-O	40,000,000

* Including extras paid in cash.
** For either fiscal or calendar year.

New Trade Marks of the Month

DIVERSEY DISC DIP
392,442

GLASER 2 in 1 TINNING COMPOUND
432,468

E-Z-GLOW
439,568

Irwin Weatherlox
440,007

FORMIX
440,414

PINOLA
440,618

IMPERMEX
441,482

RUSCO
441,548

QUALITY Q S SYSTEM
441,649

NSC
441,832

BEVITE
441,937

PINE BUDS
442,039

Pronto-Gas
442,189

FRECS
442,546

METALLOY
442,794

KUROKAMI
443,090

Laclede Firezist
443,609

WAXIDE
443,994

Pierce's FUNGI-SOL ANTISEPTIC
444,013

KELLIN
444,772

HYDROZO
445,085

Patcho
445,181

vitamight
445,869

TERCOL
445,948

CREOPHEN
446,042

charwuchar
446,227

Killicide
446,633

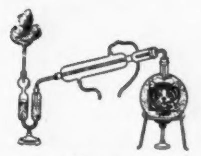
Gaby
446,915

TARZAC
447,035

WUDSODDER
447,087

V-I-W
447,174

PUROBAR
447,251



447,265

STYRALOY
447,284

BFG 1870
447,289

PROTYN
447,364

MON RAY
447,472

Trade Mark Descriptions †

392,442. The Diversey Corporation, Chicago, Ill.; Aug. 21, '40; for a cleanser in powdered form, having incidental disinfecting properties, for cleansing receptacles and containers; since July 10, '40.

432,468. Glaser Lead Company, Inc., Brooklyn, N. Y.; May 29, '40; for hot tinning compound; since May 1, '32.

439,568. Stanley Home Products, Inc., Westfield, Mass.; Jan. 10, '41; for wax polish for floors, furniture, and woodwork; since Sept. 5, '33.

440,007. John Irwin, Buffalo, N. Y.; Jan. 27, '41; for waterproofing compound for use with stucco, magnesite, and plaster; since Jan. 5, '20.

440,618. James W. Carr, Savannah, Ga.; Feb. 13, '41; for chemical wood preservative; since Aug. '37.

441,482. National Lead Co., New York, N. Y.; Mar. 12, '41; for starch product for use in the preparation or treatment of well drilling fluids; since Nov. 26, '40.

441,548. The F. C. Russell Company, Cleveland, O.; Mar. 14, '41; for rock wool for insulation purposes; since Mar. 12, '37.

441,649. The Tubbs Company, River Falls, Wis.; Mar. 17, '41; for cleaning compound having incidental propertieis as a sterilizing and germicidal agent; since Aug. 16, '40.

441,832. Niagara Smelting Corp.; Niagara Falls, and New York, N. Y.; Mar. 22, '41; for cleaning fluid for clothing and other fabric; since June 29, '39.

441,937. Anthony Laboratories, Cliffwood, N. J.; Mar. 26, '41; for vitamin preparation; since Jan. 15, '37.

442,039. The Hewitt Soap Company, Inc., Dayton, O.; Mar. 28, '41; for soap—nemelu, toilet soap; since Jan. 1, '37.

442,189. Conservative Gas Corp., Brooklyn, N. Y.; Apr. 2, '41; for gaseous fuel for industrial purposes for heating metals, plastics, and chemical compounds; since Dec. 3, '40.

442,546. Baruch Cerf, Los Angeles, Calif.; Apr. 14, '41; for additive in the nature of a lubricant for circulating mud for drilling of wells; since Apr. 8, '41.

442,794. Metalloy Inc., Trona, Calif.; Apr. 21, '41; for ores; since Dec. 1, '40.

443,090. Osaki Shoten, Ltd., Honolulu, Hawaii; Apr. 29, '41; for preparation to beautify the hair by dyeing it; since 1934.

443,609. Laclede-Christy Clay Products Co., St. Louis, Mo.; May 15, '41; for refractory material in the condition of an air-setting plastic for use in the structure of high-temperature furnaces and the like; since Oct. 22, '37.

443,994. The Bell Company, Inc.; Flare Laboratories, Chicago, Ill.; May 28, '41; for soaps, washing solutions and compounds for cleaning automobile bodies, metals, porcelains, and other smooth surfaces; since Jan. 15, '39.

444,013. Boyd J. Pierce (Pierce Products Co.) High Point, N. C.; May 28, '41; for preparation used to relieve skin itch and athlete's foot; since Jan. 1, '41.

444,772. Spencer Kellogg and Sons, Inc., Buffalo, N. Y.; June 23, '41; for drying oils and specifically a modified linseed oil useful in paints and varnishes; since June 5, '41.

445,085. J. E. Blackman (Hydrozo Products Co.), Gering, Nebr.; July 5, '41; for colorless, penetrating pore-filling solution for waterproofing and preserving masonry and wood; since Jan. 1, '37.

445,181. Roxseal Company, Inc., Long Island City, N. Y.; July 8, '41; for ready-mixed material for patching and/or resurfacing concrete and other masonry surfaces; since Aug. 5, '40.

445,869. Vital Foods Corp., Chicago, Ill.; Aug. 1, '41; for concentrate of essential vitamins and minerals; since June 9, '41.

445,948. Walter Mann and Company, Cleveland, O.; Aug. 4, '41; for cough preparation containing codeine phosphate, terpin hydrate, potassium guaiacol sulfonate, and osdium citrate in a vehicle containing alcohol, glycerine, water, but no sugar; since June 1, '40.

446,042. John Carle & Sons, Inc., New York, N. Y.; Aug. 7, '41; for disinfectant; since May 1, 1905.

446,227. Charcoal Industries, Inc., Munroe, La.; Aug. 14, '41; for charcoal; since June 20, '41.

446,633. Alger Roberson (Roberson & Sons); Aug. 28, '41; for insecticide, germicide and disinfectant; since Aug. 15, '41.

446,915. Gaby, Inc., Philadelphia, Pa.; Sept. 9, '41; for cosmetics and toilet preparations; since May 22, '30.

447,035. R. T. Vanderbilt Co., Inc., New York, N. Y.; Sept. 13, '41; for plasticizer for synthetic rubber; since Sept. 2, '41.

447,087. Louis C. Wolfson, New York, N. Y.; Sept. 16, '41; for synthetic plastic adhesive in stick form used for repairing of furniture; since July '41.

447,174. Edgar K. Van Eman (Edgar K. Van Eman Co.), Tulsa, Okla.; Sept. 3, '41; for chemical preparation for ignition waterproofing; since Jan. 1, '34.

447,251. Purobar Co., Denver, Colo.; Sept. 22, '41; for especially compounded chemical products in the nature of a brick or block for purifying the air and absorbing objectionable food odors in electrical refrigerators, iceboxes, coolers and the like; since Jan. 17, '41.

447,265. Belding Heminway Company, New York, N. Y.; Sept. 23, '41; for thread, of nylon and other synthetic fibers; since Feb. '40.

447,284. The Dow Chemical Company, Midland, Mich.; Sept. 24, '41; for thermoplastic synthetic resins comprising the products obtained by co-polymerizing styrene with other polymerizable substances; since June 6, '41.

447,289. The B. F. Goodrich Company, New York, N. Y.; and Akron, O.; Sept. 24, '41; for rubber cement, gasket and rim cement, rubber putty, rubber to metal cement, automobile top seal cement, tire dough comprising a plastic rubber for repairing cuts in pneumatic tires, belt splicing cement; since Mar. 1, '41.

447,364. Corn Products Refining Co., New York, N. Y.; Sept. 27, '41; for modified corn gluten for the manufacturer of plastics and adhesives; since Sept. 18, '41.

447,472. Kate T. Summey (Mon Ray Chemical Co.), Forest City, N. C.; Oct. 1, '41; for preparation used in the treatment of athlete's foot; since July 1, '41.

† Trademarks reproduced and described include those appearing in the Official Gazette of the U. S. Patent Office, Dec. 9, 1941—Jan. 6, 1942.

New Trade Marks of the Month

SYLVANIA
447,499

SYLVANIA
447,500

GLASCOTE
447,543

VITA·YOLK
447,616

Stonpaint
447,643

CELANESE LANESE
447,683

PERMIUM
447,715

R-C-D
447,768

R
447,774

LARVEX
447,775

Super SOLAREX
447,805

447,828

PRE-KLEANO
447,892

SHO-PAL
448,015

K.D.S.
448,021

STAINCURE
448,025

TOLLAC
448,057

ALLATUSS
448,061

ROBOL
448,191

LUBKLEEN
448,212

METHARCOL
448,221

NO-FOG
448,243

DESEPTYL
448,339

LARYNGOBIS
448,340

SOLVAMIDE
448,341

AY-TOL
448,348

METASOL
448,356

CONTRALAX
448,369

"ASMO"
448,376

TABU
448,487

NEATSOPE
448,455

KRIEGER
448,512

VITAMIN TABLETS
LAW BROS.
448,565

LUCIPHOR
448,567

STAR-CHEM
448,596

"SEL-CAR"
448,702

"SEL-NITE"
448,703

LOST-BOY
448,708

INSYN
448,642

LIQUADOL
448,724

LIQUAFIX
448,725

ASCORBICIN
448,741

STERILOPE
448,842

447,499. Sylvania Industrial Corp.; Fredericksburg, Va.; Oct. 2, '41; for sulfur; since Sept. 15, '41.

447,500. Sylvania Industrial Corp.; Fredericksburg, Va.; Oct. 2, '41; for sealing solvent; since Sept. 22, '41.

447,616. Premo Pharmaceutical Laboratories, Inc., New York, N. Y.; Oct. 8, '41; for vitamin preparation since Aug. 3, '41.

447,643. Anthony P. Sickenberger, Birmingham, Mich.; Oct. 9, '41; for ready mixed or paste paints and water colors for painting signs and general use; since June 10, '41.

447,683. Celanese Corp. of America, New York, N. Y.; Oct. 11, '41; for staple fibers made wholly or partially of cellulose derivatives; since Feb. '41.

447,715. F. E. Williamson (The Paraloy Co.), Chicago, Ill.; Oct. 11, '41; for osmium base alloy; since Sept. 10, '41.

447,768. Roberts, Cadwallader and Dilts, Inc., Camden, N. J.; Oct. 13, '41; for transparent structural waterproofing materials for spray and brush application; since Aug. 4, '41.

447,543. Al Jacobsen (Glascote Co.), Denver, Colo.; Oct. 4, '41; for auto body polish; since July 1, '41.

447,774. Zonite Products Corp.; New York, N. Y.; Oct. 13, '41; for moth-proofing composition; since Aug. 13, '41.

447,775. Zonite Products Corp.; New York, N. Y.; Oct. 13, '41; for moth-proofing composition; since Aug. 13, '41.

447,805. Great Lakes Varnish Works, Inc., Chicago, Ill.; Oct. 15, '41; for ready-mixed paints, paint enamels, and varnishes; since Apr. 17, '41.

447,828. Arthur E. Smith, Los Angeles, Calif.; Oct. 15, '41; for anesthetic materials; since Sept. 6, '41.

447,892. Rinshed-Mason Co., Detroit, Mich.; for preparation for the removal of wax and other foreign substances in preparation for such refinishing as may be done on the old surface of automobiles or other painted or lacquered surfaces; since Aug. 22, '41.

448,015. Stein, Hall & Company, Inc.; New York, N. Y.; Oct. 22, '41; for gum used as a binder and thickener for pigmented substances utilized in printing fabrics and the like; since Sept. 22, '41.

448,021. A. F. Van Wolf (Kedmont Manufacturing & Waterproofing Co.), Chicago, Ill.; Oct. 22, '41; for material (in liquid form) applicable to masonry, concrete, and wood to produce a damp-proof surface; since Nov. 1929.

448,057. The Neville Company, Neville Island, Pittsburgh, Pa.; Oct. 23, '41; for liquid hydrocarbon solvents.

448,061. Sharp & Dohme, Inc.; Philadelphia, Pa.; Oct. 23, '41; for bronchial medicaments and expectorants and cough syrups; since Sept. 23, '41.

448,191. Franco- American Chemical Company, Ltd., Boston, Mass.; Oct. 28. '41: for laxative tablets; since 1919.

448,212. West Disinfecting Co., Long Island City, N. Y.; Oct. 28, '41; for chemically compounded solvent for degreasing, cleaning and lubricating all types of metal parts, machinery, and the like: since Aug. 7, '41.

448,221. Arnold A. Feist, V.M.D., St. Paul, Minn.; Oct. 29, '41; for antiseptic which is used on wounds; since June, '13.

448,243. Carhoff Company, Cleveland Heights, O.; Oct. 30, '41; for preparation for use on glass, lenses, reflectors, windshields, goggles, physicians' or dentists' instruments, eye glasses, gas masks, windows, mirrors, and the like, for preventing the formation of fog, steam, frost, or perspiration thereon.

448,339. Specific Pharmaceuticals Inc.; New York, N. Y.; Nov. 1, '41; for sulfanilamide derivative for parenteral injection; since Aug. 28, '41.

448,340.. Specific Pharmaceuticals Inc; New York, N. Y.; Nov. 1, '41; for rectal suppository containing bismuth: since Aug. 28, '41 .

448,341. Specific Pharmaceuticals Inc.; New York, N. Y.; Nov. 1 ,'41; for sulfanilamide derivative for parenteral injection; since Aug. 28, '41.

448,348. Valentine Laboratories, Inc., Chicago, Ill.; Nov. 1, '41; for vitamin capsules; since June 18, '41.

448,356. Burkart- Schier Chemical Co., Chattanooga, Tenn.; Nov. 3, '41; for agent for the wet processing of scouting, dyeing, bleaching, and finishing textiles such as sodium hexametaphosphate; since Apr. 18, '35.

448,369. Nyal Company, Detroit, Mich.; Nov. 3, '41; for intestinal astringent used to allay loose bowel movements due to minor intestinal disturbances; since Oct. 22, '41.

448,376. Luther Ward (Ward's Pharmacy), Tuscaloosa, Ala.; Nov. 3, '41; for medicinal preparation; since Dec. 1, '31.

448,455. North American Dye Corporation, Mount Vernon, N. Y.; Nov. 7, '41; for leather dressing; since Oct. 17, '41.

448,487. James L. Younghusband, Chicago, Ill.; Nov. 8, '41; for toilet soap; since Dec. 10, '32.

448,512. Krieger Oil Co. of California; Clearwater, Calif.; Nov. 10, '41; for petroleum products.

448,565. Law Bros., San Francisco, Calif.; Nov. 12, '41; for concentrated vitamins used as a food supplement; since Oct. 19, '41.

448,567. Luciphor Inc., New York, N. Y.; Nov. 12, '41; for luminescent compositions; since Nov. 7, '40.

448,596. American Maize-Products Company, New York, N. Y.; Nov. 13, '41; for laundry starch; since Sept. 27, '41.

448,642. Industrial Synthetic Inc., Newark, N. J.; Nov. 14, '41; for chemical compounds for waterproofing fabrics and textiles; since June 12, '41.

448,702. National Copper Paint Corporation, Chicago, Ill.; Nov. 17, '41; for protective coating and for the protection of metals, susceptible to carbonization; since Sept. 23, '37.

448,703. National Copper Paint Corp., Chicago, Ill.; Nov. 17, '41; for protective coating for heat treating metals; since Oct. 9, '40.

448,708. May Rothstein, Wilkes-Barre, Pa.; Nov. 17, '41; for salve for the treatment of burns; since July 12, '38.

448,724. General Aniline & Film Corp.; New York, N. Y.; Nov. 18, '41; for chemicals and preparations and compounds thereof used in photographic processes; since Sept. 15, '41.

448,725. General Aniline & Film Corp., New York, N. Y.; Nov. 18, '41; for chemicals and preparations and compounds thereof used in photographic processes; since Sept. 15, '41.

448,741. E. R. Squibb & Sons, New York, N. Y.; Nov. 18, '41; for vitaminic preparations; since Oct. 10, '41.

448,842. Abbott Laboratories, North Chicago, Ill.; Nov. 24, '41; for drugs; since Oct. 28, '41.

U. S. Chemical Patents

Off. Gaz.—Vol. 533, Nos. 2, 3, 4, 5—p. 312

A Complete Check—List of Products, Chemicals, Process Industries

Cellulose

Stabilizing of cellulose esters having a high propionyl or butyryl content. No. 2,265,218. Herbert G. Stone to Eastman Kodak Co.

Process of producing an organic cellulose ester of improved clarity and transparency. 533 O. G.-26. No. 2,265,528. Rudolf Hofman & Wilhelm Rohm to I. G. Farbenindustrie Aktiengesellschaft.

Regenerated cellulose films and filaments dyed with an acid dyestuff and containing as an agent for promoting the affinity of said films and filaments for said acid dyestuffs, 5% to 20% of finely divided discrete particles of a synthetic linear polyamide. No. 2,265,559. William W. Watkins to E. I. du Pont de Nemours & Co.

Laminated cellulose products. No. 2,265,563. Arnold Kirkpatrick to Monsanto Chemical Co.

Production of regenerated cellulose threads. No. 2,265,646. George M. Karns to E. I. du Pont de Nemours & Co.

Hydroxy alkyl-alkyl ethers of cellulose. No. 2,265,913. Leon Lilienfeld to Lilienfeld Patents Inc.

Manufacture of cellulose. No. 2,267,087. Henry Dreyfus.

Process treating cellulose acetate which comprises applying to said material para-amino benzol-azo dihydroxyethyl-aniline in an amount of from 4% to 10% by weight of the acetate then diazotizing the dyestuff upon the material and coupling thereon from a solution beta-hydroxynaphthoic acid, the amount of the coupling component being 1% by weight of the acetate so as to produce thereon a shade ranging from green blue to blue and jet black. No. 2,267,565. Talfryn James and David C. Forsht to American Aniline Products, Inc.

Process reducing solution viscosity of regenerated cellulose which comprises treating pure comminuted regenerated cellulose sheeting with a dilute aqueous nitric acid containing solution of between 0.1 and 2.0% concentration (expressed as nitric acid) and containing nitric acid as an essential ingredient for about 4 hours between about 20°C. and 100°C. No. 2,268,902. Ralph J. Quaid to E. I. du Pont de Nemours & Co.

Ceramics, Refractories

A hydraulic cement obtained by finely grinding a clinker resulting from the semi-fusion of an intimate mixture of lime and substantially pure antigorite. No. 2,265,665. Charles A. Meek to Resistall Corp.

Method of bonding refractory material. No. 2,265,682. Owen G. Bennett and Lawrence B. Berger.

Glazed ceramic products. Method of making. No. 2,266,646. Donald E. Lower.

Refractory composition comprising zircon a minor quantity of a fluosilicate and a minor quantity of a material taken from the class consisting of phosphoric acid and a zirconium dioxide. No. 2,267,772. Eugene Wainer and Donald S. Hake to The Titanium Alloy Mfg. Co.

In method producing gas clouded vitreous enamel the step of incorporating in the enamel batch a compound containing cerium in an amount less than 1% of the enamel. No. 2,267,928. Ignaz Kreidl.

Colored sheet glass. Process making same. No. 2,268,247. John H. Fox to Pittsburgh Plate Glass Co.

Process manufacturing a reflector which comprises forming a suitable legend in a vitreous enamel upon the inner smooth surface of a tempered glass plate provided with an outer figured surface heating the plate sufficiently to fuse the vitreous enamel applying a metallic reflecting film to the smooth surface of the tempered glass plate in and about the legend, adhering a backing member to the coated surface of the glass plate through the medium of an intermediate reinforcing layer of synthetic resin, and subsequently fracturing the tempered glass plate. No. 2,268,258. William O. Lytle to Pittsburgh Plate Glass Co.

Chemical Specialty

Dried non-hygroscopic glue composition consisting as the essential ingredients glue and a reagent selected from the group consisting of urea, biuret and a mixture of about equal amounts of urea and calcium nitrate, the amount of the reagent being present not in excess of about 10% but in sufficient amount to impart remoistening values and a rapid setting quality. No. 2,265,144. Edward F. Christopher & Frank L. De Beukelaer.

Activated insecticide composition. No. 2,265,155 and 2,265,156. Robert J. Geary to The Dow Chemical Co.

Application of plant stimulants. No. 2,265,159. Ernest F. Grether to The Dow Chemical Co.

Insecticidal compositions. No. 2,265,204 and 2,265,205. Frank B. Smith and Harold W. Moll to The Dow Chemical Co.

Conductive ink comprising a highly viscous paste formed of a graphite the average particle size of which is approximately 2½ microns, an inorganic filler, wherein the amount of graphite in the graphite filler admixture is greater that 42% and less than 83%, a plasticizer comprising approximately 35 to 45 cc. of a hygroscopic polyhydric alcohol, and a highly volatile solvent which is miscible with the plasticizer. No. 2,265,419. Samuel Brand, Otto Weitmann & Kenneth J. Mackenzie to International Business Machines Corp.

In method of making chewing gum the step which comprises admixing together minor proportions of dried corn syrup and a wet, undesiccated chewing gum base, and a major proportion of sucrose, the ingredients being so proportioned as to provide a finished chewing gum having a moisture content of about 3% to about 5%. No. 2,265,465. Robert L. Wilson to Wm. Wrigley, Jr.

Method of preparing preservative wrappers for citrus fruit comprising gasifying diphenyl at least temporarily, causing the diphenyl to mix with an inert gaseous medium and projecting a mixture of diphenyl and the said gaseous medium on to the wrapping material. No. 2,265,522. Adalbert Farkas.

Printing ink having a vehicle comprising a thermoprene and heat-liquefied rubber. No. 2,265,639. Don B. Forman to The B. F. Goodrich Co.

Spongy, sound-deadening material consisting of substantially 12% of reclaimed rubber, 50% of asphalt, 30% of wood flour, and 8% of rosin. No. 2,265,770. Richard A. Crawford to the B. F. Goodrich Co.

Gum confection composition for use in the preparation of gum confectionery, said composition containing a starchy material and minor proportions of an added diastatic enzyme and a material selected from the group consisting of cream of tartar and fruit acids. No. 2,266,051. Herman Lebeson.

Flux composition containing a reaction product of boron trifluoride and at least one substance from the group consisting of unmodified alcohols, alcohol-ethers, and cyclic ether. No. 2,266,060. Mike A. Miller to Aluminum Co. of Amer.

Lip-coloring composition containing tetra hydro furfuryl alcohol, waxes, and a halogenated fluorescein. No. 2,266,540. Alphonse T. Flore to Burton T. Bush, Inc.

Wood veneer and method of treating same. No. 2,266,699. John S. Williamson.

Dry base adapted for being mixed with water to form a quick setting liquid casein glue, said base comprising milk-casein as its principal and largest ingredient lime and an alkaline solubilizing agent for said casein, and a zinc salt for accelerating the setting action of the glue. No. 2,266,736. Lawrence Bradshaw.

Composition for preventing sunburn, which comprises a vehicle having dispersed therein a small quantity of a resin derived from petroleum and capable of absorbing light of wave lengths normally tending to produce sunburn. No. 2,267,200. Arthur B. Hersberger and Henry C. Cowles, Jr. to The Atlantic Refining Co.

An insecticidal composition containing N-alkylated alkylene polyamine. No. 2,267,204. Lucas P. Kyrides to Monsanto Chemical Co.

A detergent comprising a water-soluble N-alkylated alkylene polyamine. No. 2,267,205. Lucas P. Kyrides to Monsanto Chemical Co.

Package comprising a bar of soap sealed in a sheet of wrapping material provided on one side with a moisture-, acid-, and alkali-resistant coating of vinyl resin adapted to counteract the emission of characteristic constituents of the soap for reducing wastage and deterioration thereof. No. 2,267,310. Walter V. Shearer and Garrison Householder to The Plastic Coating Corp.

Manufacture of insecticides. No. 2,267,385. Homer E. Whitmire to Joseph E. Burger.

Insecticidal composition comprising trichloro-monofluoro-benzene as a toxic ingredient. No. 2,267,587. Robert R. Dreisbach, Fred W. Fletcher and Merlin O. Keller to The Dow Chemical Co.

Composition for simultaneously mothproofing and dry cleaning including a grease-removing organic solvent in which salicylic acid is normally insoluble, and at least about one fifth of its volume of alcohol carrying salicylic acid in the proportion of toward an ounce to a gallon admixed therewith and also carrying boric acid. No. 2,267,617. Henry N. Mitchell to M. H. Hoepli.

Non-setting chocolate-flavor drink, comprising an aqueous liquid medium, chocolate particles, and a mucilaginous extract of quince seeds, said extract being present in proportion sufficient to cause said chocolate particles to remain substantially permanently in suspension under condition ordinarily encountered in manufacture and use. No. 2,267,624. Arthur E. Siehrs to Krim-Ko Co.

Detergent aid particularly useful as a wetting agent comprising essentially an alkali metal salt of the sulfuric acid derivative of a reaction product of acyclic hydrocarbon polymers having a molecular weight between about 100 and about 224 and a phenol. No. 2,267,687. Lucas P. Kyrides to Monsanto Chemical Co.

Composition of matter for treating skin eruptions consisting of eugenol, zinc oxide, and orthoform. No. 2,267,739. Adolph J. Kemppe to George B. White.

Method producing from soy beans a dehulled, disembittered, cooked and expanded product suitable for human consumption. No. 2,267,747. William J. Plews to Plews Processes, Inc.

Friction element containing petroleum coke. No. 2,267,803. Ray E. Spokes to The American Brake Shoe & Foundry Co.

Mothproofing compositions and their manufacture. No. 2,267,871. Henry Martin and Hans H. Zaeslin to J. R. Geigy S. A.

Article of manufacture comprising asbestos fibres and a bonding agent extending within the surface portions of the fibres and cementing the fibres together into a unitary article, the said agent including a compound selected from the group consisting of an aluminate or borate of a polyvalent metal. No. 2,267,913. Ralph T. Halstead to Johns-Manville Corp.

Insecticidal composition containing as an essential active ingredient a substituted aminoacetonitrile in which hydrogen cyano and amino radicals are attached to the same carbon atom of a hydorcarbon group containing from at least four to less than eight carbon atoms the amino radical being the residue of a secondary aliphatic amine. No. 2,268,108. Benjamin Collie, Rowland Hill and Wilfred A. Sexton to Imperial Chemical Industries Ltd.

Road surfacing material comprising a gel composed of soap in the interior phase and tarry material of mineral origin in the exterior phase said gel being also characterized by being anhydrous and by having a higher melting point and lower freezing point than said tarry material per se. No. 2,268,122. Vaman R. Kokatnur to Antoxygen, Inc.

Parasiticidal material. No. 2,268,206. Albert K. Epstein and Benjamin R. Harris.

Process making starch thin boiling and thick setting which comprises: treating the starch in water with an amount of calcium peroxide in the proportion of 608 grams to 1 liter of 20° Baume' starch liquor at a temperature between 46° and 52°C. (115°-125°F.) for from 24 to 48 hours; neutralizing the product with an acid capable of forming a soluble salt with the calcium and washing out this salt. No. 2,268,215. Ralph W. Kerr to Corn Products Refining Co.

Insecticide preparation comprising an insecticide from the class consisting of derris root, rotenone, timbo root, cube root and pyrethrum flowers and as a stabilizer therefor an acidylamine diarylamine having the general formula R1-NH-R2-NH-SO2-R, where R and R_1 represent aryl groups and R_2 an arylene group. No. 2,268,353. William P. ter Horst to United States Rubber Co.

Preservation of wood. No. 2,268,387. Albert L. Flenner and Frank H. Kaufert to E. I. du Pont de Nemours & Co.

Antifreeze solution. No. 2,268,388. Forest J. Funk to E. I. du Pont de Nemours & Co.

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Coal Tar Chemicals

As new articles of manufacture easily water soluble leuco-esters of N-dihydro-1:2-2'; 1'-anthraquinone azines, wherein the hydrogen atoms of the four enolic hydroxy groups are substituted by the radical —CO·C'$_6$H$_3$ (SO$_3$H, S'O$_3$H) said esters giving brown to red-brown watery solutions with intense green fluorescence and yielding when warmed in the presence of alkali the parent dyestuff. No. 2,265,157. Karl Glenz to Durand & Huguenin A. G.

The desoxycorticosterone palmitate of melting point 60-61°C. No. 2,265,183. Karl Miescher and Werner Fischer to Ciba Pharmaceutical Products Inc.

Aminoalcohol esters of acids selected from the group consisting of the alicyclic and aryl-alicyclic substituted lower aliphatic carboxylic acids and the alicyclic and aryl-alicyclic substituted lower aliphatic monohydroxy-carboxylic acid. No. 2,265,184. Karl Miescher and Karl Hoffmann to Ciba Pharmaceutical Prods., Inc.

Nuclear reduction products of aminoalkyl esters and amides of aryl substituted lower fatty acids. No. 2,265,185. Karl Miescher and Karl Hoffmann to Ciba Pharmaceutical Products, Inc.

Process of manufacturing thioformamide compounds by reacting upon a halogen-free amine containing at least one hydrogen atom in the amino-group with thioformamide. No. 2,265,212. Kurt Westphal and Hans Andersag to Winthrop Chemical Co., Inc.

Process producing pyrazolone compounds which comprises condensing an acyl acetic acid ester with a primary hydrazino monalkylsulfonic acid having at least two carbon atoms in the alkyl group, said alkyl group being taken from the class consisting of alkyl hydrocarbon radicals and hydroxy alkyl radicals. No. 2,265,221. Hans Zischler to General Aniline & Film Corp.

Process making alkenyl benzenes which comprises forming a mixture containing one of the groups consisting of alpha halogenated-alkyl benzenes and alpha halogenated-alkyl halogenated benzenes with one of the group consisting of amines and amine salts and passing said mixture through a reaction zone heated to a temperature above the boiling point of said mixture under the conditions of operation. No. 2,265,312. Wm. M. Quattlebaum and Donald M. Young to Carbide & Carbon Chemicals Corp.

Tetranuclear condensation product and process of preparing same. No. 2,265,315. Walter Salzer and Hans Andersag to Winthrop Chemical Co., Inc.

A 3, 3-bis-isoindolenylidene substituted in the 1, 1'-positions by arylamino radicals. No. 2,265,356. John S. H. Davies to Imperial Chemical Industries, Ltd.

Compounds of the cyclopentanopolyhydrophenanthrene series and process of preparing them. No. 2,265,417. Max Bockmuhl and Heinrich Ruschig to Winthrop Chemical Co., Inc.

As a new compound the 3-(bis-α,β-dihydiroxypropyl)-amino-4-hydroxy-5-acetylamino-4'-hydroxyarsenobenzene-3'-amino-monosulfoxylate. No. 2,265,424. Alfred Fehrle and Paul Fritzsche to Winthrop Chemical Co., Inc.

α-dicarbonyl compounds of the cyclopentano-polyhydrophenanthrene series and process of making same. No. 2,265,488. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Products.

Process which comprises heating a halo-geno-nitrobenzene-sulfonic acid of the group consisting of 1, 2-dichloro- and 1, 2-dibromo-4-nitrobenzene-6-sulfonic acid and 1, 2-dichloro- and 1, 2-dibromo-6-nitrobenzene-4-sulfonic acid with ammonia. No. 2,266,228. George Matthaeus, Kreis Bitterfeld to General Aniline & Film Corp.

Manufacture of cyclopentano polyhydro phenanthrene compound. No. 2,266,778. Willy Logemann and Hans H. Inhoffen to Schering Corporation.

Alkyl aromatic compounds. Method of producing. No. 2,267,725. Lawrence H. Flett to National Aniline & Chemical Co., Inc.

Process producing a capillary-active agent which comprises introducing a true sulfonic acid group into 1-chlor-9, 10-octadecylene. No. 2,267,731. Fritz Guenther, Hans Haussmann and Bruno V. Reibnitz to General Aniline & Film Corp.

Diamino-1, 4-Benzoquinones. No. 2,267,741. Gerhard Langbein to General Aniline & Film Corp.

Compound selected from the group consisting of 4-acylamino-diphenylsulfone-4'-aminoalkyl sulfonic acids, 4-acylamino-diphenylsulfone-4'-amino-phenylalkyl sulfonic acids and their water-soluble salts. No. 2,267,748. Paul Phols and Robert Behnisch to Winthrop Chemical Co., Inc.

Process for conversion of dihydroxy compounds of the acetylene series into dihydroxy compounds of the ethylene series which consists in treating dihydroxy compounds of the acetylene series in aqueous alkaline solution with metallic zinc. No. 2,267,749. Walter Reppe and Richard Schnabel to General Aniline & Film Corp.

Substituted alpha-pyrrolidones, process of producing. No. 2,267,757. Curt Schuster and Alois Seib to General Aniline & Film Corp.

Trans-androsterone and its derivatives, method of producing same. No. 2,267,759. Arthur Serini and Lothar Strassberger to Schering Corp.

A quaternary 7-amino-9-(4'-aminophenyl)-10-alkylphenanthridinium salt which quaternary salt is soluble in water and has trypanocidal properties. No. 2,267,988. Gilbert T. Morgan and Leslie P. Walls.

Method preparing 21-aldehydes of the cyclopentano polyhydrophenanthrene series comprising treatment of 21-halogeno compounds of the gregnane series with tertiary bases conversion of the quaternary ammonium compounds formed with aromatic nitroso compounds and decomposition with acid of the intermediate product obtained. No. 2,268,084. Tadeus Reichstein to Roche-Organon, Inc.

Amines of the acetylene series. Process for making. No. 2,268,129. Walter Reppe and Hellmut Scholz to General Aniline & Film Corp.

Mixture of alkylated aromatic sulfonic acids containing in the molecule at least one alkyl radical selected from the class consisting of propyl butyl and amyl radicals and at least one alkyl radical selected from the class consisting of isohexyl, isoheptyl and isoactyl radicles. No. 2,268,140. Josef Hengstenberg and Walter Linbacher and Eberhard Nold to General Aniline & Film Corp.

Preparation of coloring material for ornamenting surfaces which comprises mixing vitreous ice in the form of screened granular particles with a powdered pigment in the presence of a binder and a diluent therefor to cause said pigment to adhere intimately to the surfaces of said granular particles, drying the mixture, and separating the coated granular particles. No. 2,267,255. Victor Hawthorne and Ray Andrews to B. F. Drakenfeld & Co. Inc.

Coatings

Coating composition having a relatively high capacity for reflecting visible radiations of the spectrum and consisting of a liquid vehicle and pigment material of which not more that 25% is basic copper phosphate and the balance is a pigment having a relatively high capacity for reflecting visible radiations. No. 2,265,473. Joseph W. D. Cannell to The Sherwin-Williams Co.

Process of producing colored oxide coatings on nickel and nickel alloys. No. 2,266,117. Carl G. Crocker and Gorham K. Crosby and Robert R. Clappier to The International Nickel Co., Inc.

Process preparing a moisture vapor-proof lacquer which comprises fusing together a fusible resin and a wax into a homogeneous melt, and dissolving the homogeneous resin-wax mixture and a halogenated rubber and a plasticizer in a suitable volatile organic solvent therefor. No. 2,266,159. Edmond H. Bucy to Atlas Powder Co.

Coating. An aluminum tray and grid for receiving water to be frozen, said tray and grid possessing on their respective water contacting surfaces a water-repellant adherent relatively flexible protective coating, said coating comprising a baked enamel-like layer containing glycerol phthalate and the condensation product of approximately 60 parts by weight of urea and 320 parts by weight of formaldehyde. No. 2,266,353. Clifford R. Carney.

Metal surface protective covering consisting of an asphalt-free film comprising largely polymerized petroleum hydrocarbons of the polynuclear cyclic type, said film being characterized by its resistance to deterioration at temperatures up to 1200°F. No. 2,266,360. Thomas O. Edwards, Jr. and Stanley R. Williams to Tide Water Associated Oil Co.

Process for recovering solids of excess sprayed coating materials. No. 2,267,426. Seymour G. Saunders and Harry Morrison to Chrysler Corp.

Wrinkle drying coating composition comprising raw China wood oil, bodied drying oil resin metallic drier, solvent thinner and 2 to 5% of a wrinkle texture modifying composition comprising vegetable drying oil fatty acids dissolved in solvent, said drying oil fatty acids being selected from the group consisting of China wood oil fatty acids and linseed oil fatty acids. No. 2,268,002. William A. Waldie to New Wrinkle, Inc.

Drying oil vehicle for coating composition admixed therewith a triglyceride accelerator consisting of a high molecular weight unsaturated fatty acid triglyceride compound having conjugated double bond linkage of the formula (—CH=CH—)x, wherein x is equal to 4. No. 2,268,022. Folsom E. Drummond to New Wrinkle, Inc.

Method producing a non-smudging adherent coating on a magnesium surface which comprises treating said surface in a hot aqueous solution containing an alkali metal borate and at least one of the group consisting of the bicarbonates of the alkali metals and ammonium. No. 2,268,331. Earl G. Crooks.

Coating composition containing a drying oil of the type which rapidly develops a skin in bulk condition having incorporated therein a positive oxidation catalyst and a controller of oxidation comprising an ester of a trivalent phosphorus acid wherein at least one of the ester forming groups is an aryl or arylene group. No. 2,268,491. George D. Martin to Monsanto Chemical Co.

Dyes, Stains

Vat Dyestuff of the dibenzanthrone series and process of producing same. No. 2,265,140. Walter Bruck to General Aniline & Film Corp.

Chromable dyestuff. Process of preparing same of the tri-arylmethane series. No. 2,265,153. Wilhelm Eckert & Karl Schilling to General Aniline & Film Corp.

Manufacture of dyestuffs and intermediates therefor. No. 2,265,174. John Kendall to Ilford Ltd.

Diazo dyestuffs. No. 2,265,425. Erich Fischer and Richard Huss to General Aniline & Film Corp.

Dyestuff Intermediate. Manufacture thereof. No. 2,265,432. Arnold Kershaw & Kenneth H. Saunders to Imperial Chemical Industries Ltd.

Insoluble azo dyes. No. 2,265,433. Arnold Kershaw & Kenneth H. Saunders to Imperial Chemical Industries Ltd.

A gray to black dyeing vat dyestuff obtained by the process which comprises subjecting dibenzanthrone to dinitration by means of a nitrating agent in chlorosulfonic acid. No. 2,265,721. Joseph Deinet to E. I. du Pont de Nemours & Co.

Sensitizing dyestuffs. Manufacture thereof. No. 2,265,908. John D. Kendall to Ilford Ltd.

Cyanine type dyestuffs. No. 2,265,909. John D. Kendall, to Ilford Ltd.

Process of coloring fibrous material gray to black shades which comprises impregnating the material with a leuco bis-(pyranthronylimino)-3, 4, 9, 10-dinaphthoperylene-1', 1"dione and then carbazolizing the leuco bis-(pyranthronylimino)-dinaphthoperylene-dione by treating the impregnated material with an oxidizing condensing agent. No. 2,266,018. Maurice H. Fleysher and James Ogilvie to National Aniline & Chemical Co., Inc.

Azo dyes. No. 2,266,142. Frederic H. Adams to American Cyanamid Co.

Dyestuffs of the phthalocyanine series. No. 2,266,404. Berthold Bienert and Hermann Thielert to General Aniline & Film Corp.

Azo dyes. No. 2,266,413. Moses L. Crossley to American Cyanamid Co.

Dye images. Method of obtaining. No. 2,266,456. Lot S. Wilder to Eastman Kodak Co.

Vat dyestuffs of the anthraquinone series. No. 2,266,782. Ralph N. Lulek and Frederic B. Stilmar to E. I. du Pont de Nemours & Co.

Disazo dyes. No. 2,266,822. Chiles E. Sparks and James W. Libby, Jr. to E. I. du Pont de Nemours & Co.

Water-soluble azo dyes from amino-aryloxy-acyl-diamines. No. 2,266,823. Chiles E. Sparks and James W. Libby, Jr. to E. I. du Pont de Nemours & Co.

Insoluble azo dye. No. 2,266,824. Chiles E. Sparks and James W. Libby, Jr. to E. I. du Pont de Nemours & Co.

Dyestuff of the benzanthronyl-amino-anthraquinone acridine series. No. 2,266,879. William H. Lycan to E. I. du Pont de Nemours & Co.

Process printing dyestuffs of the dipyrazolanthronyl series. No. 2,266,890. Charles F. Miller to E. I. du Pont de Nemours & Co.

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Vat dyestuffs of the anthraquinone series and process of preparing them. No. 2,267,139. Hans Schliehenmaier and Walter Noll to General Aniline & Film Corp.
Vat dye composition for use in connection with the coloring of textile fibers by printing and pigment padding processes. No. 2,267,609. Jean G. Kern to National Aniline & Chemical Co.
Printing composition containing a diazoamino compound obtained from the reaction of an aromatic amine suitable for the production of azo dyestuffs with dicyandiamide. No. 2,267,760. Jacob B. Shohanto May Chemical Co.
Azo dyestuffs. No. 2,268,274. Werner Zerweck and Wilhelm Kunze to General Aniline & Film Corp.

Equipment—Apparatus

A Bessemer converter comprising a central tuyere box in the bottom, and bottom and side walls substantially spherical in shape extending from adjacent the outer tuyere openings and merging directly into inwardly inclined frustoconical walls. No. 2,265,511. Herman A. Brassert to H. A. Brassert & Co.
Water-softening apparatus. No. 2,265,520. Earl E. Eickmeyer & Anthony G. Horvath to The Dayton Pump & Mfg. Co.
Liquid purification apparatus. No. 2,265,741. Robert B. Morse to Carrie E. Morse & Katherine B. M. Devereux.
Apparatus for the liquid treatment of threads. No. 2,265,984. George M. Allen and Isaac P. Davis to American Viscose Corp.
Solvent recovery apparatus. No. 2,266,031. John Harman.
High vacuum distillation process, wherein a mass of material is subjected to a high vacuum at a temperature such that one or more fractions vaporize from the mass, the steps of affording a substantially unobstructed path extending from the surface of the mass for free movement of molecules of the vaporized fractions, continuously collecting a plurality of condensed fractions at regions spaced different distances from the surface of the mass and adjacent said path, and causing refluxing of the collected fractions. No. 2,266,053. Charles V. Litton to Jesse L. Market and Alexander M. Poniatoff.
Method of flocculation which comprises subjecting a liquid flowing through a flocculator to a flocculating action in successive stages by subjecting the liquid to successive circular motions from an energy source independent of said liquid flow and about horizontal axes and confining the flow of liquid from one stage to the next substantially along the axis of rotation of the liquid and closely adjacent to such axis. No. 2,266,097. Samuel L. Tolman to The Jeffrey Manufacturing Co.
Reconditioning metal surfaces. Apparatus therefor. No. 2,266,236. Herbert H. Moss and Joseph R. Dawson to The Linde Air Products Co.
Spinneret assembly for the extrusion of molten organic filament-forming compositions comprising a spinneret and a spinneret pack comprising a bed of finely divded inert granular material, and spinneret pack being located immediately adjacent the inner face of the spinneret. No. 2,266,363. George D. Graves to E. I. du Pont de Nemours & Co.
Mineral analysis apparatus. No. 2,266,840. Henry L. Alexander and Hubert I. du Pont and Willing B. Foulke to Delaware Chemical Engineering and Development Co.
Coke-oven apparatus. No. 2,266,949. Joseph Becker to Koppers Co.
Coke-oven apparatus. No. 2,266,950. Joseph Becker to Koppers Co.
Pressure resisting apparatus for removing moisture from flowing gas under pressure. No. 2,266,959. George M. Croft to Blaw-Knox Co.
Glass threads apparatus for production. No. 2,267,019. Wilhelm Esser to Oscar Gossler Glasgespinst-Fabrik Gesellschaft mit beschrankter Haftung.
Sewage sedimentation system. No. 2,267,608. Charles G. Hawley, Hope H. Degenhardt and Virginia T. Hawley to Hawley Engineering Corp.
Apparatus for making zinc oxide. No. 2,267,720. Howard M. Cyr and Gaius W. Bisbing to The New Jersey Zinc Co.
Reaction vessel. No. 2,267,768. George T. Tobiasson to Universal Oil Products Co.
Gas and liquid contact apparatus. No. 2,268,219. Emerson J. Lyons and Gordon MacLean to The Turbo-Mixer Corp.
Apparatus for surveying deep wells. No. 2,268,256. William S. Knouse to National Lead Co.
Apparatus for producing flocculation. No. 2,268,461. Richard D. Nicholas to The Jeffrey Manufacturing Co.

Explosives

Yellow basic lead styphnate in the form of tabular rectangular parallelopiped crystals. No. 2,265,230. Aaron L. Hitchens, Jr. and Frederick M. Garfield to Western Cartridge Co.
Smokeless powder comprising smokeless powder grains surface coated with phthalide. No. 2,267,261. Elton R. Allison to Hercules Powder Co.
Weigh Tank for explosives. No. 2,267,751. George D. Rogers.
In blasting initiator an ignition composition consisting essentially of a loose charge of comminuted colloided smokeless powder and a lead salt of a nitrophenol. No. 2,268,372. Lawton A. Burrows and George A. Noddin to E. I. du Pont de Nemours & Co.

Fine Chemicals

d-lysergic acid-d-l-hydroxybutyl-amide-2 of the formula $C_{20}H_{25}O_2N_3$, possessing the optical rotation $[\alpha]^{20}D=-45°$ (C=0.4 in pyridine) which is difficultly soluble in ethanol and acetone which gives the Keller's and van Urk's color reaction and which possesses strong uteroactive properties. No. 2,265,207. Arthur Stoll & Albert Hofmann to Sandoz A. G.
D-lysergic acid-1, 3-dihydroxytrime thyleneamide-2 and a process for its preparation. No. 2,265,217. Arthur Stoll and Albert Hofmann to Sandoz A. G.
Concentrate of Vitamin D_2 in evaporated milk. Process for preparation. No. 2,265,320. Reginald C. Sherwood and Charles G. Ferrari to General Mills, Inc.
Apparatus for measuring the concentration of vitamin A. No. 2,265,357. Beaumont Demarest to National Oil Products Co.
As a new therapeutic product a stabilized aqueous solution of calcium lactate containing calcium hypophosphite as a stabilizing agent said solution containing an amount of calcium lactate greater than that contained in a calcium hypophosphite free saturated aqueous solution of calcium lactate at the temperature concerned. No. 2,265,453. Hans Schmidt to Winthrop Chemical Co.
Process which comprises heating a Bzl-Bzl'-dibenzanthronyl with a phosphorus halide, and treating the resulting intermediate with a strong acid to convert it into a vat dyestuff. No. 2,265,654. Melvin A. Perkins to E. I. du Pont de Nemours & Co.
Method preparing an aminotriazine mixture which comprises heating a member of the group consisting of cyanamide and dicyandiamide in the presence of an acid condensing agent in amounts not more than 0.2 mole per mole of dicyandiamide. No. 2,265,824. Jack T. Thurston & John M. Grim to American Cyanamid Co.
Photographic desensitizing compounds. Production thereof. No. 2,265,907. John D. Kendall to Ilford, Ltd.
Tri-sodium salt of phytochlorin E. Process for making. No. 2,266,282. Eric G. Snyder to Jovan Laboratories, Inc.
Color print by multiple color development. No. 2,266,442. Karl Schinzel and Ludwig Schinzel to Eastman Kodak Co.
Color-forming photographic developer comprising an aromatic amino developing agent and an a-naphthol coupler compound containing at least one nitro group in the ring not containing the hydroxyl group. No. 2,266,452. Paul W. Vittum and Willard D. Peterson to Eastman Kodak Co.
Continuous method of effecting separation and recovery of mercury from finely ground substances such as ores containing mineral particles and also liquid mercury in free form. No. 2,266,475. Bernard W. Ramsay to Pressure Amalgamation Inc.
Process producing provitamin preparations from a crude extract of an invertebrate animal material. No. 2,266,674. Cornelia Boer-van der Wurff, Johannes van Niekerk, Engbert H. Reerink and Aart van Wiijk to Hartford National Bank and Trust Co.
Fat-soluble vitamin-containing materials. Process of refining. No. 2,266,719. Loran O. Buxton and Eric J. Simons to National Oil Products Co.
Halomethyl ethers. No. 2,266,737. Herman A. Bruson and Clinton W. MacMullen to Rohm & Haas Co.
Synthesis of vitamin B_6. No. 2,266,754. Stanton A. Harris to Merck & Co. Inc.
Alpha-butyryloxy-acrylic acid nitrile. No. 2,266,771. Heinrich Lange and Herbert Kranz to General Aniline & Film Corp.
Extraction of vitamins from vitamin-bearing oils No. 2,266,830. Harden F. Taylor and Arthur W. Wells and Vladimir A. Nedzvedsky to The Atlantic Coast Fisheries Co.
Therapeutic composition comprising a stable aqueous solution of about 1% to 5% of boric acid and at least 16% of an organic calcium salt. No. 2,266,992. Richard O. Roblin, Jr. to American Cyanamid Co.
Organic calcium salt and method of preparation. No. 2,266,993. Richard O. Roblin, Jr. to American Cyanamid Co.
Method determining presence of active enzymic substances in citrus juice products. No. 2,267,050. Jesse W. Stevens to California Fruit Growers Exchange.
Ethers of thioammeline. Process of producing. No. 2,267,068. Werner Zerweck and Eduard Gofferje to General Aniline Film Corp.
3-nitro-2-butyl acetate. No. 2,267,302. Henry B. Hass and Byron M. Vanderbilt to Purdue Research Foundation.
Gamma aceto propyl ether. Production thereof. No. 2,267,313. Joseph R. Stevens and Gustav A. Stein to Research Corp.
Photographic printing paper having a sensitizing coating comprising a mixture of a light sensitive organic salt and sodium chloropalladite in a concentration of from 0.002 gram per square inch surface to 0.060 gram per square inch surface. No. 2,267,953. Karl Schumpelt to Baker & Co., Inc.
Hydroxyalkyl glyoxalidines. No. 2,267,965. Alexander L. Wilson to Carbide & Carbon Chemicals Corp.
Process producing glutamic acid from glutamic acid hydrochloride which comprises treating a solution of glutamic acid hydrochloride with a soluble salt comprising an alkali-forming cation and an anion of an unsubstituted lower aliphatic acid containing less than three carbon atoms. No. 2,267,971. Geza Braun to Standard Brands, Inc.
Method producing 2-amino-4-chloropyrimidine which comprises bringing about reaction between phosphorus oxychloride and isocytosine in the presence of a small amount of chlorsulfonic acid. No. 2,268,033. Martin E. Hultquist and Erwin Kuh to American Cyanamid Co.
Process producing copper acetoarsenite which comprises reacting an excess of copper ammino-acetate with solid arsenious acid in an aqueous alkaline medium to form copper acetoarsenite without formation of free acetic acid. No. 2,268,123. Oswald Krefft to Chemical Marketing Co., Inc.
Process preparing methyl alpha-methyl-beta-mercaptopropionate. No. 2,268,185. William J. Burke and Franklin T. Peters to E. I. du Pont de Nemours & Co.
Hemostatic for administration hypodermically in the form of a solution containing as its active principle at least one compound selected from the group consisting of dicarboxylic acids of the general formula $C_nH_{2n-2}O_4$ where n equals 2 to 14; pyruvic acid; mesotartaric acid glycollic acid; glyoxylic acid; the salts of said acids and the lower alkyl esters of said acids. No. 2,268,347. Arthur Steinberg.
In method preparing magnesium tungstate for use as a luminescent material the steps of forming a solution of a soluble tungstate of an alkali metal and a soluble magnesium salt in water, heating said solution to a temperature above about 60°C., and continuing said heating to precipitate and crystallize out magnesium tungstate as a granular mass. No. 2,268,350. Frank E. Swindells to The Patterson Screen Co.
Method toning photographic material having a metallic silver image thereon which comprises subjecting the material to the action of toning baths included in the group consisting of toning baths containing an effective amount of sodium diaminoamidine ferricyanide the molar ratio of aminoamidine to ferricyanide being 2:1 and toning baths containing effective amounts of sodium dipotassium ferricyanide in which the molar ratio of potassium to ferricyanide is 2:1, the bath also containing at least one metal salt capable of reacting with the recation product of the metallic silver image and the ferricyanide to yield a colored water insoluble iron cyanogen complex of the metal. No. 2,268,508. Garnet P. Ham to American Cyanamid Co.
Polyquaternary ammonium salt obtained by the reaction of a tertiary amine with a dihalide. No. 2,268,533. Charles F. H. Allen to Eastman Kodak Co.

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Process of making polyhydric alcohols of the cyclopentano-polyhydro phenanthrene series comprising reacting compounds of the cyclopentano-polyhydro phenanthrene series in which a double bond is present as the linkage between a nuclear carbon atom and a side chain carbon atom with an agent capable of adding on oxygen at the double bond. No. 2,265,143. Adolf Butenandt and Josef Schmidt-Thome to Schering Corp.

Method continuously recovering by-products from granular pre-dried whole spent liquor solids obtained from spent pulp cooking liquors. No. 2,265,158. Edward G. Goodell.

Mixture of sulfonic acid chlorides containing up to three sulfonic acid chloride groups combined with the radicals of a halogenated hydrocarbon mixture having a boiling range of 200° to 350°C. obtained by the catalytic hydrogenation of carbon monoxide at atmospheric pressure and by subsequently halogenating the hydrocarbon mixture produced thereby. No. 2,265,163. Paul Herold, Karl Smeykal, Wilhelm Wolf and Friedrich to General Aniline & Film Corp.

Process for production of organic compounds containing oxygen which comprises causing ketene to react with a vinyl ketone. No. 2,265,165. Heinrich Hopff and Wilhelm Rapp to I. G. Farbenindustrie Aktiengesellschaft.

Composition of matter adapted to be handled as a melt, containing at least 90% of a homogeneous mixture consisting of from 30 to about 45% of ethyl cellulose from 25 to 65% of a plasticizer selected from the group consisting of tertiary alkyl substituted triaryl phosphates, polybromodiaryl ethers, and polyhydroaromatic diaryl ethers which have a hardness index rating in ethyl cellulose greater than 110, and from 5 to 30% of a plasticizer of hardness index rating in ethyl cellulose less than 95, and when the above-named ingredients constitute less than 100% of the composition the balance is essentially an estertype wax in amount not to exceed about 10% of the whole. No. 2,265,173. Toivo A. Kauppi & Roger W. Kolderman to Dow Chemical Co.

In process of preparing vinylmethylketone from vinylacetylene and water in the presence of contacts the steps which comprise causing the aqueous contact liquid to flow continuously in a circuit and causing vinylacetylene to flow continuously in another circuit counter-current to the circuit of the contact liquid, heating the contact liquid in the circuit externally of the tower in which the contact liquid and vinylacetylenes are brought together and introducing the heated contact liquid at the top of said tower. No. 2,265,177. Heinrich Lange and Otto Horn to I. G. Farbenindustrie Aktiengesellschaft.

Process preparing propylene oxide sulfonic acid which comprises reacting at a moderate temperature epichlorohydrin with a normal alkali sulfite in a diluent selected from the class consisting of water and aqueous alcohol, the concentration of epichlorhydrin in the reaction mixture being less than 10%. No. 2,265,200. Walter Schmidt to General Aniline & Film Corp.

Process for production of heterocyclic nitrogen compounds containing a six-membered ring which consists in treating with hydrogen at temperatures between 200°C. and that at which piperidine is decomposed compounds of the furane series selected from the group consisting of furfurol reaction products of furfurol with ammonia and hydrogenation products thereof in the presence of ammonia and a hydrogenation catalyst until piperidine is formed and recovering the latter from the reaction products. No. 2,265,201. Willi Schmidt and Friedrich Manchen to General Aniline & Film Corporation.

Process producing high-molecular weight carbonyl compounds by condensing a carbonyl compound containing at least one group selected from the class consisting of methylene and methyl groups in the presence of a substance selected from the class consisting of secondary amines and salts thereof which consists in carrying out the condensation while removing the water formed in the condensation from the reaction mixture at the rate of which it is formed. No. 2,265,211. Alois Waibel and Hermann Zorn to General Aniline & Film Corp.

In processing materials containing oxides of iron and tin to the metallic state in presence of alumina, while avoiding melting of the iron, then in another furnace zone, melting silicon with the iron in presence of the alumina and tin; and finally slagging the alumina and separating the resulting slag, ferrosilicon and tin. No. 2,265,219. Lucien C. Sturbelle to Hooker Electrochemical Co.

Process for recovery of toluene from a toluene fraction containing the same and containing like-boiling non-aromatic hydrocarbons which comprises fractionally distilling said toluene fraction in the presence of crotonaldehyde thereby vaporizing and removing as distillate said like-boiling, non-aromatic hydrocarbons and leaving a hydrocarbon residue of the distillation enriched in toluene. No. 2,265,220. Frederick W. Sullivan, Jr. to The Barrett Co.

A salt consisting of the phosphoric and gluconic acid radicals chemically combined with iron. No. 2,265,271. Sarto Desnoyers.

Process preparing 1, 1'-dithio bis arylene thiazoles which comprises oxidizing in the cold an alcoholic solution of an arylene thiazyl sulfide which is soluble either in alcohol or alcoholic hydroxide by introducing into the cooled alcoholic solution at a temperature below 10°C., chlorine gas, the arylene radical being an aromatic hydrocarbon radical selected from the group consisting of the benzene and naphthalene series. No. 2,265,299. Wm. E. Messer to U. S. Rubber Co.

Process for treatment of plasticisable compounds which comprises distributing a plasticiser substantially uniformly over the surface of particles of a plasticisable compound which are moistened with a non-solvent for the compound and then removing non-solvent for the mass by evaporation; such removal being effected in the absence of any mechanical working of the mass and the original physical state of the compound being substantially unchanged. No. 2,265,303. Wm. H. Moss to Celanese Corporation of America.

Process comprising dissolving a mercaptothiazole in an alkali aqueous solution and then subjecting said solution to the oxidizing action of nitrogen chloride whereby to precipitate the disulfide of the mercaptothiazole. No. 2,265,319. Morris G. Shepard and William E. Messer to U. S. Rubber Co.

Method of preparing dibenzothiazyl disulfide which comprises treating one molar proportion of 2-mercaptobenzothiazole in an aqueous medium at room temperature with substantially one-half molar proportion of a substance selected from the group consisting of elemental chlorine and elemental bromine. No. 2,265,347. Edward L. Carr to The Firestone Tire & Rubber Company.

A perfume ingredient consisting of hydroxy citronellal and hydroxycitronellol to stabilize the same against air oxidation, said ingredient being characterized by its lily of the valley odor. No. 2,265,437. Max Luthy and Alphonse T. Fiore to Burton T. Bush, Inc.

Polymeric N-vinyl lactams and process of producing same. No. 2,265,450. Walter Reppe, Curt Schuster and Adolph Hartmann to I. G. Farbenindustrie Aktiengesellschaft.

Process increasing viscosity of aqueous solutions of gelatin which comprises adjusting the necessary viscosity to the desired degree by adding a substance selected from the class consisting of acylamino compounds of aromatic sulfo and carboxylic acids in which the acyl radical consists of an aliphatic group of at least 10 carbon atoms. No. 2,265,463. Bruno Wendt, John Eggert and Gunter Trautman to General Aniline & Film Corp.

Combined process for converting light and heavy hydrocarbons. No. 2,265,510. Edmund G. Borden to Cities Service Oil Company.

2, 6-di-tertiary-butyl-4-methyl-phenol. No. 2,265,582. Donald R. Stevens & William A. Gruse to Gulf Oil Corp.

Production of tertiary olefins. No. 2,265,583. Donald R. Stevens & Wm. A. Gruse to Gulf Research & Development Co.

Process for the purification of aggressive waters which comprises exchanging cations therein by contacting the water with a solid, water-insoluble poly-acidic ester of a polyhydroxy organic compound having available replaceable cations. No. 2,265,585. Oliver M. Urbain & William R. Stemen to Charles H. Lewis.

Process for production of butadiene by dehydrogenation of butylene which consists in leading a gaseous mixture of normal-butylene with steam at temperatures between 500° and 700°C. over a catalyst containing more than 50% of zinc oxide and containing also at least one oxide of an element of the group consisting of chromium, vanadium, molybdenum, uranium and tungsten. No. 2,265,641. Otto Grosskinsky, Nikolaus Roh and Gunthard Hoffmann to Jasco, Inc.

Process for production of valuable products which comprises reacting a high-molecular weight multi-unsaturated polymer of a diene hydrocarbon with an inorganic acid anhydride selected from the group consisting of sulfur dioxide phosphorus trioxide and nitrogen trioxide said reaction being conducted in the presence of a compound selected from the group consisting of di-ethyl ether, di-isopropyl ether, vinyl ethyl ether, pentamethylene oxide, methyl propene methalene dioxide, ethene methylene dioxide, paraldehyde, dioxane and di-ethyl acetal. No. 2,265,722. Willem L. J. de Nie, to Shell Development Corp.

Method of recovering selective solvents. No. 2,265,757. Bernard S. Greensfelder and Monroe E. Spaght to Shell Development Co.

Method for manufacture of lower alkyl methacrylates which comprises slowly and simultaneously adding to the reaction product of acetone cyanhydrin and sulfuric acid, both water and an alcohol having less than 5 carbon atoms, from 0.5 to 2 mols of water being added per mol of acetone cyanhydrin while maintaining a temperature between 100°C. and 160°C. and withdrawing the ester by distillation as formed. No. 2,265,785. George E. Wainwright and Joseph H. Brown to Imperial Chemical Industries, Ltd.

Chlorohydrins. Preparation therefor. No. 2,265,793. Francis M. Archibald to Standard Oil Development Co.

Reducing metallic oxides to metal without melting. No. 2,265,812. Theodore Nagel.

Method producing derivatives of alphabeta-unsaturated monocarboxylic aliphatic acids. No. 2,265,814. Patrick D. Ritchie, David T. Jones and Robert Burns to Imperial Chemical Industries, Ltd.

Hydrocarbon composition. No. 2,265,819. Raphael Rosen to Standard Oil Development Co.

In process making lithographic plates treating an exposed sensitized lithographic plate with a solution of magnesium chloride modified by containing a small amount of a hydroxydicarboxylic acid. No. 2,265,829. William H. Wood to Harris-Seybold-Potter Co.

Amines and their production. No. 2,265,838. Winfrid Hentrich, Wilhelm J. Kaiser and Carl A. Lainau to The Procter & Gamble Co.

Isomerization of hydrocarbons. No. 2,265,870. George C. A. Schult to Shell Development Corp.

Process preparing a cellulose ethyl ether which comprises treating cellulose as herein defined with ethyl chloride at below 80°C. in the presence of a caustic alkali solution that contains between about 11.5 mols. and about 42.3 mols. of water per mol. of caustic alkali. No. 2,265,917. Leon Lilienfeld to Lilienfeld Patents, Inc.

Process producing a water-insoluble alkali-soluble mixed cellulose ether by treating cellulose as herein defined in the presence of a caustic alkali solution which is between about 5% concentration and about 18% concentration calculated as NaOH, with an alkylating agent and a hydroxy-alkylating agent and a hydroxy-alkylating agent wherein the treatment with the alkylating agent and with the hydroxy-alkylating agent is conducted at not substantially above room temperature. No. 2,265,918. Leon Lilienfeld to Lilienfeld Patents Inc.

Alkali soluble cellulose ethers. Treatment thereof whereby alkali solubility, viscosity characteristics and dynamometric properties are improved. No. 2,265,919. Leon Lilienfeld to Lilienfeld Patents, Inc.

Ferric guanidine oxalate and a process of making it. No. 2,265,934. Robert B. Barnes to American Cyanamid Co.

Method separating phenol from its mixture with cyclohexanone which comprises adding to such mixture a compound containing at least two alcoholic hydroxyl groups attached to saturated carbon atoms and separating phenol from the resultant mixture by distillation. No. 2,265,939. Edmund Field to E. I. du Pont de Nemours & Co.

Amidine sulfamates and a process for making them. No. 2,265,942. William H. Hill to American Cyanamid Co.

Derivatives of olefinic compounds and method of making. No. 2,265,993. Leland J. Beckham to The Solvay Process Co.

Process forming an excess of acid in esters of lower alkyl alcohols with acrylic acid and methacrylic acid which comprises completely hydrolyzing a substantial proportion of the ester by first adding an hydroxide of an alkali metal, then adding a strong mineral acid, then removing water and soluble salts. No. 2,266,004. Loring Coes, Jr. to E. I. du Pont de Nemours & Co.

Production of isobutane from normal butane. No. 2,266,011. Edmond L. d'Ouville and Bernard L. Evering to Standard Oil Co., Chicago, Ill.

Process converting a substantial portion of the straight-chain paraffin

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hydrocarbons in a substantially saturated normally liquid hydrocarbon fraction to branched-chain paraffin hydrocarbons. No. 2,266,012. Edmond L. d'Ouville and Bernard L. Evering to Standard Oil Co., Chicago, Ill.

Hydrocarbon conversion and polymerization. No. 2,266,019. Frederick E. Frey to Phillips Petroleum Co.

Method for recovery of fish oil from press liquor, comprising the steps of treating the liquor with an alkaline buffer reagent, and separating the aqueous fraction from the oil fraction. No. 2,266,036. Herbert Hempel to Gorton-Pew Fisheries Co., Ltd.

Sulfonic acid compounds and their preparation. No. 2,266,084. Alexander N. Sachanen, Arlie A. O'Kelly and Pharez G. Waldo to Socony-Vacuum Oil Co., Inc.

Method treating carbon black for use as a pigment in coating compositions included within the class consisting of oils and resins and containing a drier compound which comprises applying to the carbon black an aqueous solution of an inactivating compound for rendering the carbon black less reactive with respect to the drier compound, said inactivating compound being selected from the group of water-soluble acetates of the polyvalent metals of the class consisting of ferric acetate, cobalt acetate, copper acetate, and basic lead acetate. No. 2,266,104. Max R. Vogel and John W. Snyder to Binner & Smith Co.

Polyalkoxyalkanol esters. No. 2,266,141. Frederic H. Adams to American Cyanamid Co.

Process for reacting hydrogen and oxides of carbon. No. 2,266,161. Donald L. Campbell and Frank T. Barr to Standard Oil Development Co., A Corporation of Delaware.

In method purifying monomeric vinyl chloride obtained in pyrolyzing ethylene chloride, the step which consists in subjecting said monomeric vinyl chloride to the action of sulfuric acid having a concentration of above about 88% by weight. No. 2,266,177. Robert C. Dosser and James B. Arnold to The Dow Chemical Co.

Dicyanomethyl carbonate and method of preparing the same. No. 2,266,199. Ingenuin Hechenbleikner to American Cyanamid Co.

Thiourea. Method of making. No. 2,266,221. William B. Lerch, Clyde H. Mathis and Eugene J. Gatchell to Phillips Petroleum Co.

Solid diazoazo salt and the process of preparing same. No. 2,266,229. Ernest M. May to May Chemical Corp.

Method lowering the temperature of a given material, consisting in exposing the material to the direct action of a stream of fluid refrigerant and regulating the period of exposure of the material to the stream in accordance with the temperature of a portion of the stream which has acted upon said material. No. 2,266,292. Gerald D. Arnold.

A salt of phosphorus. Method of producing. No. 2,266,328. Campbell R. McCullough to Monsanto Chemical Co.

Etching solution comprising approximately 4 parts by volume saturated ferric chloride solution, 1 part by volume of a 50% aqueous solution of hydrofluoric acid. No. 2,266,430. Irving C. Matthews and Gordon R. Hanneman to Eastman Kodak Co.

Xanthene compounds containing in their molecule at least one acid ester of phosphorus group. No. 2,266,431. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Aluminum. metaphosphate. Preparation thereof. No. 2,266,486. Charles F. Booth to Monsanto Chemical Co.

Thioesters of disubstituted dithiophosphoric acids. No. 2,266,514. Charles J. Romieux and Kenneth D. Ashley to American Cyanamid Co.

Process retarding the deposition of stearine from salad oil at low temperature. No. 2,266,591. Eddy W. Eckey and Edwin S. Lutton to The Procter & Gamble Co.

Inorganic film products and method of making same. No. 2,266,636. Ernst A. Hauser to Research Corp.

Waterproofing and flexibilizing clay films. No. 2,266,637. Ernst A. Hauser to Research Corp.

Aliphatic Acids. Process for recovery of same from aqueous solutions thereof. No. 2,266,718. Joseph E. Bludworth to Celanese Corp. of Amer.

Water soluble substituted aminomethylene mercapto acids and the process for their synthesis. No. 2,266,747. Max Engelmann, Emeric Havas and Morris S. Kharasch to E. I. du Pont de Nemours & Co.

Process of introducing nitrogen into polyhydroxy alcohols which comprises causing a polyhydroxy alcohol to react with a polyisocyanate selected from the group consisting of adipyl diisocyanate and sebacyl diisocyanate. No. 2,266,777. Theodro Lieser.

A dielectric for electrostatic condensers and the like composed of solid hydrogenated tree resin in a major proportion and a dielectric material comprising hydrogenated tree resin and castor oil. No. 2,266,810. Samuel Ruben.

A dielectric for electrostatic condensers and the like comprising a solid mixture of hydrogenated castor oil and chlorinated naphthalene. No. 2,266,813. Samuel Ruben.

Oxygen evolving substance comprising zinc peroxide and an oxygen-evolving catalyst in the form of a water-soluble ionizable compound of gold. No. 2,266,835. Thomas J. Webb to Merck & Co. Inc.

In manufacture of light-colored or colorless sulfonated fatty acid compounds involving sulfonating a fatty acid compound and washing the acid reaction mass, the improvement which comprises incorporating in the washing medium a relatively small amount of a compound capable of evolving sulfur dioxide upon contact with acid. No. 2,266,843. Ralph M. Beach to National Oil Products.

Process for separating glycerol from crude glycerol comprising glycerol, higher boiling constituents and salt. No. 2,266,941. Gerald H. van de Griendt to Shell Development Co.

Method settling solids from ore pulps which comprises treating the ore pulp with an effective amount of at least one of the wetting agents selected from the group sulfated high molecular alcohols, sulfonated esters of higher alcohols and dibasic acids, and alkylated aryl sulfonates and allowing the finely divided solid particles to settle. No. 2,266,954. Charles F. Bonnet and Robert B. Booth to American Cyanamid Co.

New composition of matter, consisting of blown octadecadiene acid foots derived by the process of preparing 9, 11-octadecadiene 1-acid by subjecting ricinoleic acid to a temperature above its pyrolytic point and below the decomposition point, followed by removal of said drastic octadecadiene acid by vacuum distillation, with subsequent drastic gaseous oxidation of the residuum by a conventional blowing process. No. 2,266,960. Melvin De Groote and Arthur F. Wirtel to Petrolite Corp., Ltd.

Manufacture of gases containing CO and H from CO_2 and CH_4. No. 2,266,989. Max Radtke to Koppers Co.

Hydrolysis of polymerized vinyl esters. No. 2,266,996. Norman D. Scott and John E. Bristol to E. I. du Pont de Nemours & Co.

Phosphorus recovery. Improvement in process. No. 2,267,077. George W. Bruke to The American Agricultural Chemical Co.

Molybdenum carbonyl. Production thereof. No. 2,267,099. Walter Hellriegel to I. G. Farbenindustrie Aktiengesellschaft.

Aqueous solution consisting of materials of the group consisting of phenols, phenol-homologues, substitution products of the phenol-homologues and fatty acid soaps containing fatty acid radicals with 6 to 10 carbon atoms. No. 2,267,101. Richard Hueter and Heinz J. Engelbrecht to "Unichem" Chemikalien Handels A.-G.

Process treating urea synthesis effluents. No. 2,267,133. Frank Porter to The Solvay Process Co.

Dense soda ash. Production thereof. No. 2,267,136. Harold E. Robertson to The Solvay Process Co.

Aluminum soaps. Method of making. No. 2,267,148. Charles J. Boner to Battenfeld Grease and Oil Corp.

Diphenylphenol. No. 2,267,155. Russell L. Jenkins to Monsanto Chemical Co.

Process hydroxylating an unsaturated glyceride which comprises treating the glyceride with a solution of substantially anhydrous hydrogen peroxide in a substantially anhydrous and essentially inert organic solvent for the glyceride, in the presence of catalytically active oxide of a metal of the group consisting of vanadium, osmium, chromium, cerium, tungsten, molybdenum, and ruthenium. No. 2,267,248. Nicholas A. Milas to Research Corp.

Manufacture of acetylene derivatives of the cyclopentanopolyhydrophenanthrene series, comprising reacting, in a homogeneous medium, a carbonyl compound of this series with a salt of an acetylene, derived from a metal of group 1 of the periodic system. No. 2,267,257. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Recovery of organic acids by distillation. No. 2,267,269. Harold C. Cheetham and David A. Rothrock to The Resinous Products & Chemical Co.

Solution of formaldehyde buffered between about pH 5 and pH 7.5, which contains about 15% to about 30% of formaldehyde, about 20% to about 35% of sodium acetate, and about 2% to about 6% of an ammonium salt. No. 2,267,290. Ian C. Somerville and Harold G. Turley to Rohm & Haas Co.

Active metal compounds for electric discharge devices. No. 2,267,292. Delos H. Wamsley to Radio Corp. of Amer.

Recovery of hydrocyanic acid from final cooler water of coke oven gases by precipitating zinc cyanide. Improvement in process. No. 2,267,293. Robert N. Washburne and Le Roy U. Spence to Rohm & Haas Co.

Process improving thermal stability of nitroparaffins, which comprises incorporating therewith a phenolic antioxidant having a critical oxidation potential at least as low as the critical oxidation potential of alphanaphthol. No. 2,267,309. Murray Senkus to Commercial Solvents Corp.

Process treating varnish thinners and solvents which comprises subjecting a mixture consisting essentially of a volatile varnish thinner or solvent to the action of an oxidizing agent in the presence of a fraction of a per cent of a soap dissolved therein of a metal selected from the group consisting of a cobalt and manganese at a temperature below about 40°C., the action of the oxidizing agent being carried out in the absence of film-forming ingredients. No. 2,267,360. Herbert O. Albrecht to E. I. du Pont de Nemours & Co.

Process for production of a carbonyl compound comprising introducing a nitro-hydrocarbon salt into an acid solution, the acid being sufficiently soluble in the reaction medium to produce an acid concentration sufficiently high to prevent localized alkalinity in the reaction mixture where the reaction is occurring. No. 2,267,375. Kenneth Johnson to Purdue Research Foundation.

Carboxylic acids. Improvements in process of manufacturing. No. 2,267,377. John F. Olin and Frederick P. Fritsch and George E. Hinds to Sharples Chemicals Inc.

Process producing carburetted water gas. No. 2,267,434. Charles I. Tenney to Semet-Solvay Engineering Corp.

Solubilizing claylike minerals. No. 2,267,490. Karl Buche and Hans Ginsberg to The Goldschmidt Corp.

Zinc sulfate solutions. Process for purification thereof. No. 2,267,659. Mario Magnaghi.

N. N'-lower aliphatic diacyl-N. N'-dicyclohexyl alkylene diamines. No. 2,267,685. Lucas P. Kyrides to Monsanto Chemical Co.

Manufacture of piperazine. No. 2,267,686. Lucas P. Kyrides to Monsanto Chemical Co.

Polymerization of symmetrical dichlorethylene. No. 2,267,712. Walter Bauer.

Process for production of alcoholates which comprises reacting sodium hydride with an alcohol. No. 2,267,733. Virgil L. Hansley to E. I. du Pont de Nemours & Co.

Pyridine carboxylic acid and the copper salts thereof. No. 2,267,734. Clyde O. Henke, Ronald G. Benner and Robert B. Scott, Jr. to E. I. du Pont de Nemours & Co.

Process for hydrolyzing fats. No. 2,267,750. Norman G. Robisch to The Procter & Gamble Co.

Process of preparing platinum alloy catalysts for gas reaction and the catalysts obtainable thereby. No. 2,267,753. Konrad Ruthardt to I. G. Farbenindustrie Aktiengesellschaft.

Water-soluble moth-proofing agents consisting of aromatic sulfocarboxylic acid esters of aromatic hydroxy compounds containing halogen atoms selected from the group consisting of hydroxynaphthalenes, hydroxydiphenyls, hydroxydiphenylmethanes and hydroxytriphenylmethanes. No. 2,267,756. Heribert Schussler to General Aniline & Film Corp.

Colloidal dispersions of 1, 2-dihydronaphthalene polymer. No. 2,267,773. Joseph F. Walker to E. I. du Pont de Nemours & Co.

Process purifying aqueous solutions of caustic alkali containing dissolved sulfides. No. 2,267,809. Lawson E. Border to Shell Development Co.

In process decolorizing a yellowish colored crude vinyl methyl ketone produced from vinyl acetylene and water in the presence of mercury as a catalyst, the step which comprises heating said crude vinyl methyl ketone at temperatures of at least 80°C. in the presence of an inert diluent until a colorless product is obtained upon distilling the mixture. No. 2,267,829. Heinrich Lange and Otto Horm to I. G. Farbenindustrie Aktiengesellschaft.

Process removing silica from water which comprises treating the water with aluminum and ferric hydroxides in a ratio of 4 to 10

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milligrams per liter of aluminum hydroxide expressed as metallic aluminum and 25 to 50 milligrams per liter of ferric hydroxide expressed as metallic iron to 10 to 15 milligrams per liter of silica present in the water to be treated and separating the water and precipitate. No. 2,267,831. Otto Liebknecht and Lothar Gerb to The Permutit Co.

Aqueous sizing dispersion comprising a rosin size consisting of from about 65 to about 92% by weight of free rosin and from about 8 to about 35% by weight of rosin soap, a protective colloid and an agent selected from the group consisting of dried whey, sugar, corn syrup, glycerol, and ethylene glycol, said agent being employed in an amount sufficient to render the dispersion stable to coagulation upon repeated freezing at temperatures in the range of —15° to —23°F. for 16 hours. No. 2,268,112. Arthur C. Dreshfield to Hercules Powder Co.

Process treating clays. No. 2,268,131. George J. Barker and Emil Truog to Wisconsin Alumni Research Foundation.

Process separating gases by thermal diffusion which comprises confining a body of gas between two elongated surfaces, maintaining said surfaces at different temperatures, setting up a circulation of the confined gas in such manner that it flows in one direction along one surface and in the opposite direction along the other, and withdrawing the lighter constituents from one end of said body of gas and the heavier from the other. No. 2,268,134. Klaus Clusius to I. G. Farbenindustrie Aktiengesellschaft.

Production of maleic acid which comprises passing a vaporous mixture of succinic acid with a gas comprising oxygen over an oxidizing catalyst at a temperature within the range of 250 to 600°C. No. 2,268,136. Otto Drossbach to I. G. Farbenindustrie Aktiengesellschaft.

Composition and process for treating fibrous materials. No. 2,268,141. Roland Kapp and Karl T. Steik to National Oil Products Co.

Dielectric composition comprising a chlorinated aromatic hydrocarbon which contains as stabilizer up to 10% by weight of a polycyclic hydrocarbon selected from the group consisting of dihydronaphthalene and dihydronaphthalene dimer. No. 2,268,146. Victor F. Hanson and Paul La Frone to E. I. du Pont de Nemours & Co.

Member of class of aliphatic gamma-oxophosphonic acids of at least eight carbon atoms, and salts and anhydrides thereof. No. 2,268,157. Carl S. Marvel.

Composition of matter essentially a homogeneous mixture of halogenated ethylene polymers of different halogen content and which consists preponderately of the product obtained by mixing two different halogenated ethylene polymers differing in halogen content by at least 4% and by not more than 12%, the amounts of said polymers of different halogen content present in the mixture being from about equal parts thereof to about five parts of one and about one part of the other. No. 2,268,162. James R. Myles and Francis S. Bridson-Jones to Imperial Chemical Industries, Ltd.

Process preparing dialkylethenones. No. 2,268,169. John C. Sauer to E. I. du Pont de Nemours & Co.

Bleaching-out layers containing the N-diethanol-N'-allyl-thiourea. No. 2,268,324. André Polgar and Charles Halmos.

Quaternary ammonium compounds. No. 2,268,395. Clyde O. Henke and Josef Piki to E. I. du Pont de Nemours & Co.

Oxidative condensation of organic mercaptans and amines. No. 2,268,467. George W. Ashworth to Monsanto Chemical Co.

Sulfonation of organic compounds. No. 2,268,443. John A. Crowder to The Solvay Process Co.

Method continuously converting hydrocarbons in the presence of a bauxite catalyst. No. 2,268,535. August H. Schutte to The Lummus Co.

Leather

Process deliming limed pelts which comprises treating the said pelts with solutions of water-soluble salts of carboxylic acids containing nitrogen and at least 2 organic radicals substituted by carboxyl groups in alpha-position to a nitrogen atom. No. 2,266,448. Otto Trosken, Walter Pense to General Aniline & Film Corp.

Method of tanning and bleaching hides, skins and leather which comprises immersing the stock in a solution of an o-amyl phenyl monosulfonate-formaldehyde condensation product. No. 2,268,091. Joseph G. Niederhorn and Frederick D. Thayer, Jr. to American Cyanamid Co.

Metals, Alloys

Method treating molten ferrous metal which comprises adding thereto a grain-refining amount less than 1% of an addition agent consisting of between 50% and 75% silicon; iron; at least one element of the group consisting of beryllium and boron, in an aggregate percentage between 0.1% and 10% and at least one element of the group consisting of magnesium calcium, barium and strontium, in an aggregate percentage between 25% and 50%. No. 2,265,150. James H. Critchett and Walter Crafts to Electro Metallurgical Co.

Process for vaporizing metals, metal alloys, metal compounds, and other solid mineral substances to produce finely divided material. No. 2,265,180. Rudolf Maier to Elektro-Metallurgische Apparatebau Aktiengesellschaft.

Process for immersion deposit of nickel on iron which comprises immersing the iron in a solution selected from the group consisting of nickel sulfate, nickel chloride, and nickel nitrate, and reducing the acidity of the solution by the addition of a compound selected the group consisting of lithium, sodium and potassium hydroxide. No. 2,265,467. Horace W. Alexander & Richard S. Sheldon to General Motors Corp.

Blast furnace treatment of low grade manganese-iron ore. No. 2,265,863. Percy H. Royster.

Utilization of manganese-iron ores, process therefor. No. 2,265,864. Percy H. Royster.

Reducing poor manganese ore containing phosphorus. Process therefor. No. 2,265,865. Percy H. Royster.

Smelting manganese ore. No. 2,265,866. Percy H. Royster.

Treating poor manganese ores containing phosphorous. Process therefor. No. 2,265,902. Hans Hahl to Percy H. Royster.

Recovery of precious metal from desert sands and from desert placer. No. 2,265,977. Albert K. Andrews.

Method of treating molten heavy metal baths to effect the removal therefrom of aluminum oxide, nitride and hydride compounds. No. 2,265,985. Victor O. Allen to Wilbur B. Driver Co.

Method working cast beryllium-copper alloys containing 1.5 to 2.10% beryllium. No. 2,266,056. Wayne E. Martin to The Beryllium Corp.

Alloy consisting essentially of silicon, calcium, and barium, the silicon predominating and the ratio of barium to calcium being within the range of 1:3 to 3:1. No. 2,266,122. Augustus B. Kinzel to Electro Metallurgical Co.

Silicon alloy and its use in the treatment of iron and steel. No. 2,266,123. Augustus B. Kinzel to Electro Metallurgical Co.

Manganese silicate ores. Method of treating. No. 2,266,137. George C. Westby.

In art of extracting gold micelle from its ores, that process which comprises comminution of the ore, dispersion of the gold or its compounds by physico-chemical means from the gangue of the liquor resulting from dispersion, and recovery of the gold from the filtrate. No. 2,266,155. James J. Bonesteel.

Alloy for use in spark plug electrodes and the like. No. 2,266,318. Walter F. Heller to General Motors Corp.

Metal treating composition for the treatment of ferrous metal frictional surfaces to enhance the wearing qualities of said surfaces comprising an aqueous solution containing from approximately 25% to approximately 60% caustic soda and the reaction products formed by addition of from approximately ½% to 15% sulfur. No. 2,266,378. Bruce B. Farrington and Ronald T. Macdonald to Standard Oil Co. of Calif., San Francisco, Calif.

Process of preparing a ferrous metal bearing surface for use with extreme pressure lubricants comprising chemically treating said surface with an aqueous phosphate solution which will react therewith to form a coating of iron phosphate thereon. No. 2,266,379. Robert K. Floyd to Standard Oil Co. of Calif., San Francisco, Calif.

Method of pretreatment of a bearing surface of ferrous metal including the steps of pretreating the said surface with an active sulfur reagent to form an iron sulfide film on said surface, and then contacting said surface with an aqueous solution of an alkali chromate. No. 2,266,380. George L. Neely and Victor M. Kostainsek to Standard Oil Co. of Calif., San Francisco, Calif.

Age hardenable, low expansion, nickel-iron-titanium alloy. No. 2,266,481. Albert M. Talbot to The International Nickel Co.

Age hardenable nickel-iron-chromium-titanium alloy possessing controlled thermoelastic properties. No. 2,266,482. Norman B. Pilling and Albert M. Talbot to The International Nickel Co., Inc.

Heat treatment of steel. No. 2,266,565. Donald D. Ormsby to Clark Equipment Co.

Metallurgical alloy containing 35 to 45% titanium, 2 to 14% chromium, 1 to 14% silicon, 3 to 14% aluminum, less than 0.2% carbon, and the balance iron plus impurities. No. 2,266,745. Viatcheslav V. Efimoff to The Titanium Alloy Manufacturing Co.

Process treating a bath of molten copper by addition of sodium thereto. No. 2,266,750. Harvey N. Gilbert to E. I. du Pont de Nemours & Co.

Arc welding electrode which when melted by the arc will yield a weld metal deposit which upon normal cooling is predminantly austenitic. No. 2,266,762. Theophil E. Jerabeck to The Lincoln Electric Co.

Manufacture of high grade iron and steel. No. 2,266,816. Stevan Ruzicka.

Method producing a selenium rectifier which consists in subjecting the rectifier element after the conversion of the selenium to the metallic state to the action of a solution containing approximately 25 grammes of caustic soda per litre of water. No. 2,266,922. Leslie E. Thompson and Alexander Jenkins to The Union Switch & Signal Co.

Stainless steel treatment and product. No. 2,266,952. Frederick K. Bloom to Rustless Iron and Steel Corp.

Metallurgical furnace. No. 2,267,041. Raymond L. Patterson to Hardy Metallurgical Co.

An amalgamator comprising a drum having a pool of mercury in its lower portion, an upwardly directed supply pipe to convey material to be treated to the drum and having its discharge end above the mercury pool, a baffle associated with the discharge end of the supply pipe to part the fluid flowing therefrom, a frustoconical distributor dome enclosing said baffle and said pipe end, and having walls depending into the mercury pool, and slime-water removal means in the upper portion of said drum. No. 2,267,042. Paul R. Philbrick.

Highly pure manganese titanium alloys. Method of producing. No. 2,267,298. Reginald S. Dean to Chicago Development Co.

Alloy suitable for the preparation of die castings having good finish, resistance to atmospheric corrosion, and ease of machinability, said alloy containing from in excess of 75% up to about 95% zinc, 2% to 30% copper, and 5% to 38% manganese, the total of said alloying constituents amounting to substantially 100%. No. 2,267,299. Reginald S. Dean to Chicago Development Co.

Alloy of manganese and nickel containing from 82.5% to 95% manganese, balance nickel, said alloy having a vibration damping capacity of more than 5% at low stresses and resulting from heating said alloy to a temperature between about 900 degrees C. and its melting point and slowly cooling the same to room temperature. No. 2,267,300. Reginald S. Dean and Clarence T. Anderson to Chicago Development Co.

Hot rollable brass containing the following element in substantially the indicated percentages by weight: copper, 64 to 68; lead, 0.1 to 0.35; manganese, 1 to 3; zinc, balance. No. 2,267,301. Reginald S. Dean to Chicago Development Co.

In froth separation of metalliferous ores, the step comprising effecting the froth separation in the presence of a straight chain unsaturated primary aliphatic amine having at least ten carbon atoms. No. 2,267,307. Anderson W. Ralston and William O. Pool to Armour and Co.

Corrosion-resistant metallic structure which comprises a metal base, a coating of vitreous enamel fused to the metal base, and means to maintain the metal structure electrically negative with respect to its surroundings in order to cathodically protect from corrosion those parts of the metal base which are exposed by defects in the coating. No. 2,267,361. Orrin E. Andrus to A. O. Smith Corp.

Method operating a molten bath for case hardening metals which initially included 20 to 40% of sodium cyanide, 9.2 to 28.4% barium carbonate, 5 to 20% of potassium chloride, the balance consisting of sodium chloride, which comprises regulating the activity thereof by the addition thereto of a mixture including from 50 to 75% of alkali metal cyanide, 15 to 30% of a substance chosen from the group consisting of barium chloride and strontium chloride, the balance consisting principally of alkali metal chloride. No. 2,267,413. James S. Meyer to American Cyanamid Co.

Method of plating metals. No. 2,267,665. Ulrich Raydt and Karl Staubwasser to Firma Osnabrucker Kupfer-und Drahtwerk.

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Process of recovering zinc. No. 2,267,698. Thomas R. Janes to Superior Zinc Corp.

Flux for hard metal solder comprising a polyboric acid reaction product of an aqueous mixture of at least 17% but less than 60% boric acid and more than 40% but not in excess of 83% potassium fluoride. No. 2,267,762. Johann S. Streicher to The American Platinum Works.

Method producing a flux for hard metal solder comprising reacting an aqueous mixture of boric acid and sodium fluoride in the proportions of 55% to 71% boric acid and 45% to 29% sodium fluoride. No. 2,267,763. Johann S. Streicher to The American Platinum Works.

Removal of iron from magnesium-base alloys. No. 2,267,862. Joseph D. Hanawait, Charles E. Nelson and Graydon E. Holdeman to The Dow Chemical Co.

Improved stainless steel of the low carbon 18 chromium-8 nickel type characterized by a marked resistance to pit corrosion. No. 2,267,-966. Albert L. Kaye, Robert S. Williams and John Wulff to The Chemical Foundation, Inc.

Heat treatment of high-speed steel. No. 2,268,053. Frank P. Miller and Walter A. Reese to McCrosky Tool Corp.

Method producing increased withdrawal resistance to metal fastenings consisting of treating said fastenings with a chemical solution containing as its essential active ingredient monoammonium phosphate. No. 2,268,323. Theodore J. Martin and Arthur Van Kleeck.

Hard abrasion resisting ferrous metal alloy. No. 2,268,426. Robert W. Schlumpf and Anderson D. White to Hughes Tool Co.

Hard abrasion-resisting ferrous metal alloy. No. 2,268,427. Robert W. Schlumpf to Hughes Tool Co.

Hard ferrous metal alloy resistant to abrasion. No. 2,268,428. Robert W. Schlumpf to Hughes Tool Co.

Method separating tin from the iron in tin cans and the like which comprises oxidizing the tin on the cans and then separating the same from the cans by melting the cans in a furnace with substances to form a slag and removing the tin with the slag. No. 2,268,484. Barlow W. Hill.

Radioactive alloy composed of from one billionth (0.000000001) per cent to one one-hundredth (0.01) of one percent of radium about 3% of manganese and the balance substantially all nickel. No. 2,268,503. John H. Dillon to The Firestone Tire & Rubber Co.

Radioactive alloy composed of one-billionth (0.000000001) per cent to one-hundredth (0.01) per cent of polonium, 2 to 6% of manganese, 0.75 to 1.25% of silicon and the balance substantially all nickel. No. 2,268,504. John H. Dillon to The Firestone Tire & Rubber Co.

Process cold drawing stainless steel which comprises treating the steel with a solution of hydrochloric acid which contains easily hydrolizable ferric salts and then drawing the steel so treated. No. 2,268,525. Gerhard Roesner and Helmuth Ley to American Lurti Corp.

Paint, Pigments

Pigment composition yielding on dispersion in a liquid film-forming vehicle a colored coating composition. No. 2,265,127. Elmer K. Bolton to E. I. du Pont de Nemours & Co.

In process producing an improved pigment the step which comprises suspending a pigment comprising calcined calcium sulfate in a solution of a compound adapted to give by reaction with calcium sulfate a calcium compound which is less soluble than calcium sulfate, the amount of said compound in solution being chemically equivalent to between about 0.1% and about 10% of the calcium sulfate content. No. 2,266,233. Ray L. McCleary to E. I. du Pont de Nemours & Co.

Process producing improved rutile titanium oxide pigment comprising calcining hydrolyzed precipitated titanium oxide in the presence of a small amount of an alkaline earth metal chloride having a melting point above substantially 750°C. No. 2,226,260. James H. Peterson to E. I. du Pont de Nemours & Co.

Pigment composition and process of making same. No. 2,266,793. Charles F. Oppermann to E. I. du Pont de Nemours & Co.

Paint comprising a water insoluble paint vehicle, pigment dispersed therein, a small amount of water soluble amine soap, and a small amount of water not less than that produced in reacting an amine and a fatty acid in forming said soap, the soap and water serving to prevent the pigment from settling out as a hard sediment. No. 2,267,240. Paul Kummel.

Process preparing a pigment comprising 3:3′-dimethyldiphenyldisulfide-4:4′-bis-(azo-B-naphthol) substantially free of mono-tri- and poly-sulfides, which consists of heating 2-methyl-4-thiocyanophenyl-(azo-B-naphthol) with an alkali solution to bring about formation of the disulfide pigment, separating the liquor from the pasty solid mass of disulfide pigment, and drying the said pasty solid mass. No. 2,267,639. James H. Clayton and Bernard Bann to The Manchester Oxide Co., Ltd.

Water insoluble azo pigment. No. 2,267,867. Roy H. Kienle to American Cyanamid Co.

In the direct conversion of level toned uniform wet pigmentary magmas precipitates and pastes into a dry pigment without loss of the uniformity and level tone, the method which comprises mixing an emulsion with such a wet pigmentary paste, said emulsion being an intimate dispersion in water of a non-aqueous liquid dispersion in water of a non-aqueous liquid volatile under drying conditions emulsion being aided by the presence of a surface active agent breaking the emulsion to release said non-aqueous liquid in contact with the pigment particles and drying the pigment by evaporation and removal of the water and the non-aqueous liquid. No. 2,268,-144. Vincent C. Vesce to Harmon Color Works, Inc.

Paint composition comprising a chlorinated isobutylene polymer, a drying oil and a pigment. No. 2,268,415. Arnold J. Morway, Floyd L. Miller to Standard Oil Development Co.

Paper, Pulp

Method of producing glossy-surfaced coatings on paper and similar sheet material. No. 2,267,470. Fred Kabela and George F. Whiting to Lowe Paper Co.

Petroleum

Method dewaxing petroleum oils. No. 2,265,139. David G. Brandt to Cities Service Oil Co.

Composition of matter for coloring petroleum products comprising a combination of diphenyl with a dyestuff suitable for coloring petroleum products. No. 2,265,189. John W. Orelup.

An improved cracking catalyst for conversion of heavy hydrocarbon oils into gasoline. No. 2,265,388. Ralph M. Melaven to Standard Oil Co.

Process converting heavy hydrocarbon oil to high knock rating gasoline. No. 2,265,389. Ralph M. Melaven and Rodney V. Shankland to Standard Oil Co.

Method separating valuable hydrocarbons from gaseous mixtures containing hydrocarbons. No. 2,265,527. Luther R. Hill to The M. W. Kellogg Co.

Isobutane. Process for production by catalytic isomerization. No. 2,265,548. George C. A. Schuit to Shell Development Corp.

Method separating hydrocarbon fluids. No. 2,265,558. John T. Ward and Henry M. Nelly, Jr. to the M. W. Kellogg Co.

Process for the separation of paraffinic and non-paraffinic fractions from mineral oil containing the same which comprises extracting said oil with a selective solvent separating the extract phase soluble in said solvent from the raffinate phase insoluble therein, commingling said extract phase with an anti-solvent and extracting said mixture of extract phase and anti-solvent with a further addition of selective solvent to separate an intermediate raffinate insoluble in said solvent from the extract phase soluble therein. No. 2,265,567. David R. Merrill to Union Oil Co. of California.

Well treating fluid comprising an acid capable of forming water-soluble salts with the earth formation and a small amount of a wetting agent. No. 2,265,759. Howard C. Lawton, Donald A. Limerick and Albert G. Loomis to Shell Development Co.

Drilling mud. No. 2,265,773. James F. Larkin.

Composition of matter comprising in combination a major portion of a hydrocarbon oil from ½ to 10% by weight of a chlorinated carbon compound, and from .001% to 2% by weight of a sterol. No. 2,265,774. Bert H. Lincoln and Waldo L. Steiner to Continental Oil Co.

Grease composition and method for making same. No. 2,265,791. John C. Zimmer and Arnold J. Morway to Standard Oil Development Co.

An oil emulsion comprising a mineral oil, water, an emulsifying agent and a foam suppressing salt selected from the class of salts which are characterized in that they are produced by reacting an alkali metal hydroxide with an amphoteric oxide. No. 2,265,799. Ejnar W. Carlson and Elmer B. Cyphers to Standard Oil Development Co.

In catalytic cracking of petroleum oil to produce motor fuel of high anti-knock properties wherein the oil to be cracked is passed in vapor form through a reaction zone containing a bed of cracking catalyst; the improvement which comprises progressively passing the bed of catalyst through the reaction zone and passing the oil vapors through said bed of catalyst in a direction transverse to the general direction of movement of catalyst through the reaction zone. No. 2,265,837. Wm. E. Harding to Standard Oil Development Co.

Process for recovering hydrocarbon vapors from a plurality of segregated feed gas streams containing various substantial proportions of recoverable hydrocarbon vapors by use of a certain gas absorption tower operation. No. 2,265,845. Paul E. Kuhl to Standard Oil Development Co.

Lubricating composition comprising a mineral lubricating oil and a dithiocarbamate compound. No. 2,265,851. George L. Matheson to Standard Oil Development Co.

Process treating oil and gas wells to increase production. No. 2,265,-923. Joseph S. Normand.

Improved Diesel fuel having in admixture therewith a minor proportion, sufficient to decrease the ignition delay period, of a compound having the general formula R.CX.SNO in which R represents a radical selected from the group consisting of alkyl, alkaryl, aryl, and aralkyl radicals and X is selected from the group consisting of oxygen and sulfur. No. 2,266,021. Richard S. George and George S. Crandall, Edwin M. Nygaard and Darwin E. Badertscher to Socony-Vacuum Oil Co.

Liquid lubricant for internal combustion engines, including a body of mineral oil containing an active oxidation and corrosion inhibitor, the main constituent of said inhibitor being taken from the group consisting of calcium sulfonate, barium sulfonate, and strontium sulfonate, said lubricant being substantially free of metal salts which tend to increase materially the corrosion effect on alloy bearings of the cadmium-silver and copper-lead types. No. 2,266,-325. Arthur Lazar and Paul M. Ruedrich to Tide Water Associated Oil Co.

Treatment of petroleum oils. No. 2,266,359. Thomas O. Edwards, Jr. and Oscar Larson to Tide Water Associated Oil Co.

Method dehydrogenating paraffinic hydrocarbon gases which comprises contacting said gases at reacting temperatures with a catalyst comprising "activated alumina" made by precipitating the trihydrate of alumina from an aluminate solution and calcining the precipitate at temperature between 300 and 800° C. and a vanadium-oxygen compound. No. 2,266,520. Carlisle M. Thacker to The Pure Oil Co.

Magnesium and aluminum soap grease. No. 2,266,544. Herbert C. Freuler to Union Oil Co. of California.

Process dewaxing hydrocarbon oils. No. 2,266,553. Leo D. Jones to The Sharples Corp.

Process dewaxing hydrocarbon oils. No. 2,266,554. Leo D. Jones to The Sharples Corp.

Method locating oil deposits which consists in sinking a plurality of false wells, dropping containers of gas absorbing material within said wells, in such a manner as to expose the adsorbent material to the gases in said wells, after a predetermined time, and making a comparative analysis of the gas absorbed in each well. No. 2,266,-556. Walter A. Kelly.

Method of processing hydrocarbons to produce motor fuel. No. 2,266,848. Marvin L. Chappell to James W. Weir.

Method of inhibiting formation of solid aliphatic hydrocarbon hydrates in high pressure natural gas transmission pipe line at temperatures above the freezing point of water. No. 2,266,981. Benjamin Miller to Cities Service Oil Co.

Dewaxing aid. No. 2,267,093. Frank W. Hall and Wilfred N. Meyer to The Texas Co.

Alkylation of hydrocarbons. No. 2,267,097. George B. Hatch, Ernest F. Pevere, Louis A. Clarke. Frank H. Bruner to The Texas Co.

Diesel fuel. Manufacture thereof. No. 2,267,109. Marcus T. Kendall to The Texas Co.

Dewaxing aid. No. 2,267,111. Edwin C. Knowles to The Texas Co.

Lubricating oil of the type useful in lubricating internal combustion engines and having increased resistance to sludging in the crank case of such engines, greater color stability and greater resistance

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to decomposition under crank case conditions which comprises a petroleum lubricating oil having mixed therewith a relatively small amount of quinhydrone. No. 2,267,142. William A. Smith.

Method heating hydrocarbon fluids. No. 2,267,170. John H. Rickerman to Gasoline Products Co.

Compounded lubricant comprising a mineral lubricating oil and from 1% to 10% of a polyphenyl substituted methane having at least one hydroxyl-containing radical having not more than one carbon atom between the hydroxyl group and the ring, selected from the group consisting of methylene diresorcine, aurine, and methylene dibetanaphthol. No. 2,267,337. Franz R. Moser and Dirk R. Nijk to Shell Development Co.

Process producing alkylated hydrocarbons by the interaction of isoparaffins and olefins. No. 2,267,457. Arthur R. Goldsby to Texaco Development Corp.

Process refining hydrocarbon oils containing objectionable sulfur, color and gum-forming compounds, which comprises subjecting the oil to treatment with used sulfuric acid, which has been obtained from the alkylation of isoparaffins with olefins in the presence of strong sulfuric acid, whereby such objectionable compounds are substantially removed. No. 2,267,458. Arthur R. Goldsby to The Texas Co.

Compression ignition fuel comprising fuel oil having an initial boiling point of at least 300°F. and an organic borine in quantity sufficient to substantially increase the cetane number of said fuel oil, said borine containing at least one branched-chain hydrocarbon radical. No. 2,267,701. Leonard N. Leum to The Atlantic Refining Co.

Alkylation of paraffin hydrocarbons. No. 2,267,730. Aristid V. Grosse and Carl B. Linn to Universal Oil Products Co.

Process preparing a reduced nickel hydrogenation catalyst which comprises impregnating a refractory support with nickel sulfate heating to remove water and treating alternately with a mixture of ammonia and hydrogen and with moist air at a temperature within the approximate range of 550-1,200°F. until a reduced nickel substantially free of sulfate is produced. No. 2,267,735. Vladimir N. Ipatieff and Ben B. Corson to Universal Oil Products Co.

Process regenerating spent reduced nickel catalysts containing sulfur compounds of the metal which comprises converting the sulfur compounds to the chloride of the metal by heating the catalyst with the chlorine at about 550-900°F., and then reducing the chloride to the metal by heating with ammonia at about 550°-900°F. No. 2,267,736. Vladimir N. Ipatieff and Ben B. Corson to Universal Oil Products Co.

Process for polymerization of olefins which comprises subjecting said olefins to contact with a catalyst comprising essentially a complex formed by the interaction of dioxane and sulfuric acid. No. 2,267,737. Vladimir N. Ipatieff and Fladimir Haensel to Universal Oil Products Co.

Catalytic conversion of hydrocarbons. No. 2,267,766. Charles L. Thomas and Herman S. Bloch to Universal Oil Products Co.

Process preparing supported catalyst for hydrocarbon conversion reactions which comprises treating a substantially inert support with a non-aqueous solution of an alkyl silicate and a metal alkoxide, hydrolyzing said compounds to deposit hydrated metal oxide upon said substantially inert support and drying. No. 2,267,767. Charles L. Thomas to Universal Oil Products Co.

Aqueous bituminous emulsions. Process for producing. No. 2,267,810. Ulric B. Bray and Lawton B. Beckwith to Union Oil Co. of California.

Treatment of wells producing mineral fluid. No. 2,267,855. Leonard C. Chamberlain to The Dow Chemical Co.

Method of cracking higher boiling hydrocarbons into lower boiling hydrocarbons suitable for motor fuel. No. 2,268,109. Gerald C. Connolly to Standard Oil Development Co.

Cracking oils using synthetic catalytic compositions. No. 2,268,110. Gerald C. Connolly to Standard Oil Development Co.

In manufacture of an oil selected from the group consisting of sulfated and phosphated fatty oils the step which comprises incorporating in the oil a relatively small amount of a compound selected from the group consisting of hydroxy carboxylic acids, derivatives thereof having a free hydroxyl group and at least one free carboxyl group and water-soluble salts of these compounds. No. 2,268,127. Ralph E. Porter to National Oil Products Co.

Method of geophysical investigation. No. 2,268,130. Morris M. Slotnick to Standard Oil Development Co.

Improved process for catalytically cracking heavy hydrocarbon oil to produce lower boiling hydrocarbons of high octane number suitable for motor fuel. No. 2,268,187. Durand Churchill, Jr. to Standard Oil Development Co.

Grease-like lubricant capable of forming an invert emulsion with water comprising from 0.25% to 5% of an ester of a high molecular weight fatty acid having at least one hydroxyl group, 5% to 45% of an inert substantially non-abrasive finely divided solid material and 50% to 94.75% lubricating oil. No. 2,268,234. Elmer W. Adams and Lawrence C. Brunstrum to Standard Oil Co.

Fuel for compression-ignition engines of the Diesel type, comprising essentially a hydrocarbon fuel and a small amount of about 1% to about 5% of an organic compound containing a thiocarboxylic acid radical for imparting better ignition qualities to the fuel. No. 2,268,382. Gould H. Cloud and Louis A. Mikeska to Standard Oil Development Co.

Fuel for compression-ignition engines of the Diesel type comprising a liquid hydrocarbon Diesel fuel boiling above 400°F. and an added small proportion of sulfur in a free and loosely combined form to improve substantially ignition qualities of the fuel, free sulfur being added in an amount above 0.025%. No. 2,268,383. Pharis Miller and Gould H. Cloud to Standard Oil Development Co.

Fuel for compression-ignition engines of the Diesel type, comprising essentially a hydrocarbon fuel and a small amount of about 1% to about 5% of an organic compound containing an active thiocarboxylic acid radical and nitrogen for imparting better ignition qualities to the fuel. No. 2,268,384. Gould H. Cloud and Louis A. Mikeska to Standard Oil Development Co.

Process isomerizing paraffin hydrocarbons. No. 2,268,401. Charles N. Kimberlin, Jr. to Standard Oil Development Co.

Lubricant comprising a major proportion of a lubricating oil base stock and a small amount of a wax-modifying agent comprising essentially a compound having this general formula: XR-CO-Ar-CO-R′ in which R is an alkyl group having at least 10 carbon atoms, Ar is an aromatic hydrocarbon group and R′ is an alkyl group having less than 10 carbon atoms. No. 2,268,410. Eugene Lieber to Standard Oil Development Co.

Composition a mineral oil and a small proportion of a condensation product of a polycarboxylic acid halide and a petroleum oil fraction. No. 2,268,409. Eugene Lieber to Standard Oil Development Co.

Resins, Plastics

A non-polymeric ester of a polymethylol phenol in which the hydrogen atoms of the phenolic and of the methylol groups are replaced by the acyl radical of a monocarboxylic acid. No. 2,265,141. Herman A. Bruson to The Resinous Products & Chemical Co.

Process increasing resistance to light, air and heat of an ester of natural rosin which comprises the step of heating the said ester of natural rosin at a temperature of 130 to 240°C. in the presence of 1/10 to 5% of iodine until intra-molecular rearrangement has occurred in the resin acid radicals thereof substantially without change of the unsaturation of the ester. No. 2,265,161. Torsten Hasselstrom and Edward A. Brennan.

Method producing a resinous composition which comprises heating a ligneous wood and a rosin acid with water in amount sufficient to substantially completely submerge the wood under super-atmospheric pressure at a temperature within the range of about 240°C. to about 330°C. until the cellular structure of the wood has disappeared then recovering a resin as the residue remaining after removal of the water solution. No. 2,265,181. Robert W. Martin to Hercules Powder Co.

Process producing water-soluble condensation products which comprises causing an alkylene oxide to act on a ketone of the formula R_1-CO-R_2 wherein R_1 and R_2 are radicals selected from the class consisting of aliphatic cyclo-aliphatic, aromatic aliphatic aromatic and heterocyclic radicles containing from 5 to 11 carbon atoms and introducing into the reaction product a salt-formiing group. No. 2,265,194. Bruno v. Reibnitz and Max Neber to General Aniline & Film Corp.

Process for manufacture of melamine from dicyandiamide and liquid ammonia at a temperature up to 100°C. in which the proportion of ammonia used is less than that necessary to dissolve completely the dicyandiamide at room temperature but not substantially less than 20% of the weight of dicyandiamide. No. 2,265,215. Gustave Widmer to Ciba Products Corp.

Cast tube of a polymerized organic compound light-reflecting lamellae distributed therethrough, said lamellae being oriented concentrically with respect to the major axis of said tube. No. 2,265,226. John H. Clewell and Reuben T. Fields to E. I. du Pont de Nemours & Co.

Method of making a molded article comprising the steps of providing a copolymer containing methyl methacrylate and methacrylic acid in granular form, wetting the same with a monomeric substance comprising methacrylic acid and forming a plastic mass, shaping the mass and heating the same to polymerize the monomeric substance present. No. 2,265,236. Samuel S. Kistler to E. I. du Pont de Nemours & Co.

Process comprising treating a granular polymer of methyl methacrylate having adsorbed thereon a polymeric acid from the group consisting of polymers of acrylic and alkacrylic acids, with an aqueous solution of an alkaline phosphate of an alkali metal, and, thereafter, washing said granular polymer with water until free from salt. No. 2,265,242. Barnard M. Marks to E. I. du Pont de Nemours & Co.

Process of preparing a resin which comprises reacting together polyvinyl alcohol and an organic compound having a reactive carbonyl group selected from the group consisting of butyraldehydes, valeraldehyde and cyclic ketones, in the presence of methylol sulfonic acid as a condensation catalyst. No. 2,265,255. Gelu S. Stamatoff to E. I. du Pont de Nemours & Co.

Polymerized vinyl alcohol article. Process of making article of the class described which comprises heating an aqueous solution of polymerized vinyl alcohol to a temperature of 100°C. to about 200°C., extruding the same through a nozzle and treating the extruded material with warm air to evaporate the solvent and form a thread, tube or the like. No. 2,265,283. Willy O. Herrmann, Erich Baum and Wolfram Haehnel to Chemische Forschungsgesellschaft.

Preparation of vinyl halides. No. 2,265,286. Archie B. Japs to B. F. Goodrich Co.

Polymers of dicyclic ureas. No. 2,265,416. Herbert Bestian to General Aniline & Film Corp.

Vinyl polymers. Manufacture of articles therefrom. No. 2,265,436. Frita Loblein to Deutsche Celluloid-fabrik Aktiengesellschaft.

In process producing vinyl chloride by leading acetylene and hydrogen chloride over active carbon the step which comprises supplying metallic mercury to the reactants. No. 2,265,509. Johannes Boesler, Ernst Eberhardt, Wilhelm Sandhaas and Robert Stadler to I. G. Farbenindustrie Aktiengesellschaft.

A molding composition comprising a polyvinyl resin from the group consisting of polyvinyl acetate and polyvinyl acetals, and a hydrogenated polymer of dihydronaphthalene having a melting point of 155-175°C., in an amount of 1-10% by weight of said polyvinyl resin. No. 2,265,619. Roger G. Aitken to E. I. du Pont de Nemours & Co.

Copolymers of vinyl compounds and unsaturated allyl esters and ethers. No. 2,265,640. Benjamin S. Garvey and Claude H. Alexander to The B. F. Goodrich Co.

Composition comprising the resinous reaction product of ingredients comprising the following components in the stated molar ratios: one mole of a phenol, at least one mole of an aldehyde and not exceeding substantially one-fourth mole of a benzoylsulfimide. No. 2,265,688. Gaetano F. D'Alelio & Joe B. Holmes to General Electric Co.

Process preparing resins comprising bringing an aromatic petroleum distillate boiling above about 212°F. into reaction with at least 3 mols of an alkyl dihalide per mol of aromatic hydrocarbon in said petroleum fraction in the presence of about 1 to 5% by weight of aluminum chloride, based on said aromatic hydrocarbons and heating the resulting mixture under reflux until a precipitate appears and for a substantial time but not more than about 1 hour thereafter, separating said precipitate from the liquid reaction products and then separating a hard brittle resin from solution in the liquid reaction products. No. 2,265,847. Kenneth C. Laughlin & Simpson D. Sumerford to Standard Oil Development Co.

Additional patents on Resins, Plastics and those on Rubber and Textiles for above-mentioned volumes will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. We expect to begin reporting German patents in the near future. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published May 6, 1941 (Cont'd from last month).

Stabilized Hydrocyanic Acid comprising liquid HCN and a small amount of a substance selected from the group consisting of phosphoric acid and phosphorus pentoxide sufficient to prevent polymerization. No. 396,356. E. I. du Pont de Nemours & Co., Inc. (Mark Walker.)

Composite Metal Bearing comprising a non-porous metal supporting back, a coarse pored metallic sponge bonded to the back and having its pores filled with soft bearing metal. No. 396,360. General Motors Corporation. (Roland P. Koehring.)

Ethylene Derivative production by at least partially dehalogenating a halogenated substance of the class consisting of polymers of ethylene which are normally solid and polymers of ethylene which are normally semi-solid. No. 396,370. Imperial Chemical Industries Limited. (Eric W. Fawcett.)

Permanent Magnet Alloy comprising 17.5-18.5% Ni, 8.5-9.5% Al, 9.5-10.5% Co, 4-6% Cu and the balance iron. No. 396,371. The Indiana Steel Products Company. (Howard W. Russell and Lloyd R. Jackson.)

Glutamic Acid Hydrochloride production from corn gluten by hydrolyzing the gluten, purifying the solution of humin substances, adding thereto hydrochloric acid, concentrating, cooling to supersaturation, and crystallizing and removing the mother liquor. No. 396,375. International Patents Development Company. (J. Paul Bishop and Floyd L. Tucker.)

Zinc Vaporizing Furnace comprising a series of trays each independently supported in a vaporizing chamber so as to carry only its own load of molten zinc. No. 396,376. International Smelting & Refining Company. (Randwald S. Olsen and George Anderson.)

Magnesium-Beryllium-Zirconium Alloy characterized by its fine grain structure resulting from the addition of zirconium to magnesium-beryllium alloy. No. 396,383. Magnesium Elektron Limited. (Gaston Gauthier.)

Hydrogen Zeolite treatment of water for softening it, including controlling the acidity of the softened water, which comprises passing in alternation through a pervious bed of hydrogen ion zeolite a flow of hard water to be incompletely softened and a regenerating flow of water containing merely enough acid to convert a substantial part but not all of the zeolite into hydrogen zeolite. No. 396,388. The Permutit Company. (Ray Riley.)

Refining Alkyl Phenols containing aromatic mercaptans by blowing the phenols with air at 0.90°C. while in solution of an alkaline-reacting liquid medium stable under the conditions of the treatment. No. 396,408. Shell Development Company. (Walter J. Hund and Samuel Benson Thomas and Daniel B. Luten, Jr.)

Removing Mercaptans by steaming from an aqueous solution of a caustic alkali which is substantially non-volatile under the conditions of the steaming. No. 396,409. Shell Development Company. (David L. Yabroff and Ellis R. White.)

Polyhydric Alcohol Production by reacting an organic epoxy compound with an organic hydroxy compound in the presence of a heavy metal compound which is at least partially soluble in colloidal form in the liquid reaction mixture. No. 396,410. Shell Development Company. (Arthur F. A. Reynhart.)

Acyl Sulfide Production by reacting a mercaptan with a carboxylic acid in the presence of sulfuric acid as catalyst and benzene while distilling the water formed by the reaction from the reaction mixture as an azeotrope with the benzene substantially as soon as the water is formed. No. 396,411. Shell Development Company. (Clyve C. Allen.)

Rubber Compounding by adding to the pigments and softeners a sufficient quantity of a rubber non-solvent to form a paste with the wetted pigments, mixing the thus formed paste with powdered rubber, and evaporating off the rubber non-solvent. No. 396,424. Wingfoot Corporation. (Harvey G. Greer.)

Extrusion and Dyeing of Yarns, films and similar products, produced by extruding an organic derivative of cellulose and a color lake formed by reacting a dye having affinity for the organic derivative of cellulose and having an amino or substituted amino group with a compound selected from the group consisting of tungstic acid, phosphoric acid, molybdic acid, phospho-tungstic acid, phospho-molybdic acid and phospho-molybdo-tungstic acid. No. 396,429. Camille Dreyfus. (William Whitehead and Richard R. Sitzler.)

Shrinking Textile Fabric by feeding the fabric at a definite rate and without tension towards a shrinking bath, spreading the full width of the fabric across the bath and guiding the fabric below the surface of the shrinking bath by means of a spreading member. No. 396,430. Henry Dreyfus. (Ralph J. Mann and Wilfred Harmer.)

Dewatering Fibrous Material by forming a web supported by moving strings, passing the web through one or more squeezing presses, and removing the web from the strings. No. 396,431. Henry Dreyfus. (Joseph Billing and David R. Johnston.)

Freezing Flesh Food by encasing in an air-tight glaze formed from an aqueous liquid containing an edible non-injurious solute which has the effect of lowering the freezing point of the liquid below that of pure water and of increasing the resistance of the glaze to cracking, peeling and fracture as compared with pure water glaze. No. 396,434. The Canadian Fishing Company Limited. (Harry R. Beard and Carl A. Hedreen.)

Alkid Resin Colloidal Suspension formed by heating in an aqueous medium an alkyd resin which has not been converted to the final infusible, insoluble form in the presence of clay. No. 396,435. Canadian General Electric Company Limited. (Richard D. Kleeman.)

Artificial Rubber obtained by polymerization of butadienes in aqueous emulsions containing emulsifying agent products of the general formula

$$X—CH_2—CH_2—Y—CH_2—CH_2—NZ$$

wherein Y means oxygen or sulfur, NZ means the radical of a secondary amine or a quaternary ammonium compound, X means the radicle of a secondary amine, an acid amine, and ester, an ether, a quaternary ammonium compound or a hydroxyl group, at least one of the radicles X and Z containing at least 8 carbon atoms being directly attached to each other in an open chain linkage. No. 396,437. I. G. Farbenindustrie A. G. (Wilhelm Parnwitz and Bernhard Ritzenthaler.)

Basic Dyestuffs selected from the class consisting of triarylcarbenium salts, diarylerenium salts with ring closure and arylamino-aryl-azenium salts and sulfonic acid derivatives thereof containing at least one amino group in which at least one hydrogen atom, attached to an amino group, is replaced by a gamma-oxobutyl radicle. No. 396,441. (Henrich Hopff and Adolf Diebold.)

Chromable Dyestuffs. No. 396,442. Wilhelm Eckert and Karl Schilling.

Leuco Esters soluble in water of compounds capable of being vatted having the following general formula:

$$R_2—O—R_1—O—R_2$$

wherein the grouping $O—R_1—O$ stands for a radical of a compound capable of being vatted, the O's being the oxygen atoms of the former keto groups of the unreduced compounds, and R_2 stands for an acyl radical selected from the group consisting of a benzoyl radical having more than one of the groups effecting solubility in water, a naphthoyl radical and an acid radical of an aromatic, hydroaromatic and aliphatic carboxylic acid having at least one of the groups effecting solubility in water. No. 396,443. Walter Mieg and Franz Wieners.

Granted and Published May 13, 1941

Coconut Drying Process consisting in subjecting the coconut to air under pressure of about 100 pounds per square inch in a closed container, releasing the air pressure, drying the material, and removing it from the container. No. 396,457. Archie Stirling Glen.

Rotary Filter for liquids and gases. No. 396,459. Gustaf Haglund.

Normalizing Hot-Pressed Plywood panels composed of a plurality of bonded wood plies with adjoining plies having the grains thereof running at an angle to each other. No. 396,464. James V. Nevin.

Plywood Siding, weatherproof and vermin resisting, comprising a flat three ply wood panel composed of a core veneer sheet integrally bonded in opposite broad faces thereof to a surface veneer with an insoluble and infusible cresylic acid-aldehyde resin, the grain of the core sheet being at an angle to the grain of the surface sheets. No. 396,465. James V. Nevin.

Aluminum Alloy for cooking utensils comprising by weight 1.5-2.5% Zn, 2-3% Mg, 0.25-0.75% Si and the remainder aluminum. No. 396,471. Advance Aluminum Castings Corporation. (Erik G. Grundstrom.)

Permanent Magnet Alloy, precipitation hardened, consisting of 5-55% Fe, 15-50% Ni and 30-75% Cu. No. 396,483. Canadian General Electric Company Limited. (Otto Dahl, Joachim Pfaffenberger and Paul Melchior.)

Luminescent Lamp having a glass sheath interposed between the luminescent material and the discharge path between the electrodes, the sheath being of soft glass consisting of 65% silica, 16% potassium oxide, 5% each of calcium oxide and sodium oxide, 3% of alumina, and 2% each of magnesium oxide, boric oxide, and barium oxide. No. 396,486. Canadian General Electric Company Limited. (Robert L. Breadner, John T. Randall and John W. Ryde.)

Foreign Chemical Patents

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Food Treating apparatus for producing sterilized baked goods. No. 396,492. Canadian General Electric Company Limited. (Robert F. James.)
Pyridinium Compound manufacture by treating 2:4-diaminophenyl-1-pyridinium chloride with a polymerizing compound from the group consisting of aldehydes and methyloureae. No. 396,496. Chemical Works formerly Sandoz. (Valentin Kartaschoff and Willy Steinemann.)
Aminotriazine Manufacture from a cyan derivative of ammonia selected from the group consisting of dicyandiamide and cyanamide with addition of liquid ammonia under pressure in two phases. No. 396,497. Ciba Products Corporation. (Gustave Widmer and Willi Fisch.)
Differential Flotation of mixed sulfide ores containing lead, copper, zinc and iron using an aluminum salt such as aluminum chloride or aluminum sulfate in the pulp. No. 396,498. Combined Metals Reduction Company. (William D. Green.)
Yellow Glass composition containing silica, alkali oxide, zinc oxide and from 0.005% to about 0.1% nickel oxide. No. 396,502. Corning Glass Works. (Henry H. Blau and Weston H. Gillett.)
High Silica Glass containing over 93% silica, under 1% alkali and under 6% boric oxide, the glass having pores which contain an extraneous material other than air and water. No. 396,504. Corning Glass Works. (Harrison P. Hood and Martin E. Nordberg.)
High Silica Glass containing over 93% silica, under 6% boric oxide and under 1% alkali, said glass being vitreous and non-porous and containing also sufficient coloring matter to produce coloration therein, the coloring matter being inorganic. No. 396,505. Corning Glass Works. (Martin E. Nordberg and Harold E. Rumenapp.)
Foundry Mold Composition comprising sand and a non-swelling colloidal clay of which montmorillonite is a large constituent. No. 396,512. Eastern Clay Products, Inc. (Norman J. Dunbeck.)
Basic Methine Production by causing a compound obtained by condensing a heterocyclic-omega-aldehyde with a member selected from the class consisting of rhodanine, N-alkyl-rhodanine, and N-aryl-rhodanine to react with a member selected from the class consisting of alkyl halide and alkyl sulfate. No. 396,515. General Aniline and Film Corporation. (Oskar Riester.)
Methine Dyestuff production by condensing a quaternary salt of a member selected from the group consisting of 2-methyl-oxazole, 2-methyl-thiazoline, and 2-methyl-selenazoline with a member selected from the group consisting of a nitrogenous heterocyclic base hydrogenized in the heteronucleus and containing linked to the nitrogen atom the molecular grouping A—N=CH— wherein A is aryl, and a salt thereof. No. 396,516. General Aniline & Film Corporation. (Walter Dieterle and Fritz Bauer.)
Briquette Charbonizing apparatus utilizing heated gas circulation. No. 396,524. Humphreys & Glasgow Limited. (Eric C. Mengel.)
Laminated Sausage Casing comprising a layer of fabric, a layer of cellulose material, and an intermediate layer of regenerated viscose cellulose bonded to the fabric and to the cellulosic material. No. 396,525. Industrial Patents Corporation. (Charles T. Walter.)
Treatment of Buttermilk to recover milk solids therefrom without deleterious change in their individual characteristics. No. 396,530. Arthur D. Little, Inc. (Charles D. Hartford.)
Paper Coating apparatus. No. 396,531. Lowe Paper Company. (George F. Whiting and Fred Kabela.)
Metal Negative Process utilizing spray coating of metal to reproduce smooth surface objects. No. 396,534. Metallizing Engineering Co., Inc. (William C. Reid.)
Metal Producing apparatus for handling mixture of comminuted ore and slag. No. 396,535. M.F.C. Company. (John W. Flannery.)
Fabric Decorating machine. No. 396,536. National Automotive Fibres, Inc. (Clarence Davies.)
Clicker Die and Stock comprising cold drawn or rolled air-hardening alloy steel strip comprising C 0.40—0.70%, Mn 0.30—0.80%, Si 0.10—0.70%, Cr 0.30—1%, Mo 0.05—0.50%, and the remainder Fe. No. 396,540. Progressive Service Company. (Carl G. Deubel.)
Printing Color containing 12-18% of thiodiglycol. No. 396,552. Society of Chemical Industry in Basel. (Fritz Reichart and Karl Stebler.)
Lime Slurry Calcination comprising mixing with the raw slurry a sufficient quantity of dry slurry to produce a porous mass, forming a layer of the mass, passing hot gases through the layer to effect complete calcination of one stratum only of the layer, removing said stratum, and combining the remainder of the layer with additional slurry. No. 396,551. F. L. Smidth & Co. (Nikolai Ahlmann.)
Pulp Liquor Treating apparatus and method comprising incinerating the liquor in a furnace chamber under furnace conditions yielding a residue of the incombustible constituents of the liquor in the form of a dry unsintered ash, and removing substantially all of the ash produced from the furnace chamber by flotation in the furnace glass generated. No. 396,566. George H. Tomlinson and The Babcock & Wilcox Company. (George H. Tomlinson and Leslie S. Wilcoxson.)
Coated Material comprising a flexible, transparent, regenerated cellulose base sheet or film having exterior surface coating formed of a moisture proofing composition, the film forming constituents of which consist essentially of a mixture of a moisture proofing waxy substance and a synthetic resin, the ingredients of said moisture proofing composition being present in proportions producing a non-tacky and non-greasy coating. No. 396,571. Canadian Industries Limited. (William H. Charch.)
Moistureproofing Composition in which the film forming constituents consist essentially of a moisture-proofing waxy substance and a resin. No. 396,572. Canadian Industries Limited. (William H. Charch.)
Organic Mercury Compound resulting from the reaction of a polyhydric phenol having a hydroxyl group incapable of taking part in the reaction, with a hydroxide of a mercurial aromatic hydrocarbon. No. 396,574. Fahlberg-List Aktiengesellschaft Chemische Fabriken. (Karl Memminger and Bernhard Gaudian.)
Azomethine Dyestuff containing metal. No. 396,575. Hans Krzikalla, Helmut Pfitzner and Karl Schmidt.)
Vat Dyestuff of the anthraquinone series. No. 396,576. Walter Mieg and Franz Wieners.
Anthraquinone Dyestuff. No. 396,577. Walter Mieg and Hans Raab.
Wool Dyestuff of the anthraquinone series. No. 396,578. Klaus Weinand and Kurt Bamberger.
Sulfite Waste Liquor processing by biological decomposition of its organic constituents, comprising causing fermentation of neutralized liquor, freed from gases, in absence of added nutrient salts and in presence of vegetable matter carrying fermentative cultures developed on said vegetable matter in the presence of sulfite waste liquor. No. 396,579. Ludwig Hahn.

Granted and Published May 20, 1941

Precious Metal Alloy composed of about 56% silver, 27% palladium, 14% copper, 2% gold, and 1% zinc. No. 396,603. Reginald Victor Williams.
Concrete densifying process comprising forming a stable emulsion of oleaginous material and water having added thereto Portland cement and a finely divided, active, hydraulic material, forcing the emulsion under pressure into voids in a structure, and holding under pressure until set. No. 396,602. Louis S. Wertz.
Resinous plastic condensation product of formaldehyde and an aryl-alkyl ketone, and the process which comprises reacting a formaldehyde with a hydroxyphenylheptadecenyl ketone or hydroxyphenyl-undecyl ketone. No. 396,610. Armour & Company. (Anderson W. Ralston, Robert J. Vander Wall and Stewart T. Bauer).
Precious metal alloy comprising from 20 to 60% platinum, 10 to 40% palladium, 10 to 50% silver, and from 1 to 25% gold, wherein the combined content of platinum and gold is not less than about 40% and the combined content of palladium and silver is not more than 60%. No. 396,612. Baker & Company, Incorporated. (Cecil Spender Sivil and Edward O. Liebig).
Rubber compound for insulation consisting essentially of deproteinized rubber 29.0-34% finely divided zinc oxide 23.0-28%, finely divided inert filler 37.0-44%, anti-oxidant 0.5-2% and thiuram polysulfide 0.5-2%. No. 396,621. Canadian General Electric Company, Limited. (Emil W. Schartz and Evan T. Croasdale).
Sulfur dioxide recovery from gases employing a continuous process for the absorption and liberation of SO_2 which comprises absorbing it in a cycling ammonium bisulfite-ammonium monosulfite solution in which the ammonium monosulfite is the active ingredient and the total weight of ammonia in these compounds is not greater than 13% of the weight of the solution. No. 396,636. The Consolidated Mining and Smelting Company of Canada, Limited. (Robert Lepsoe).
Plastic game ball in which at least the outer portion consists of a composition comprising gutta-percha and a water-resistant thermoplastic polymerization product of a member of the group consisting of vinyl compounds and substituted vinyl compounds. No. 396,639. Dunlop Tire and Rubber Goods Company Limited. (Douglas F. Twiss, Samuel G. Ball and John F. Cookson).
Fire-resistant rubber articles having electrical conductivity comprising a surface layer of electrically conductive composition of rubber or the like and an adjacent layer of electrically non-conductive composition of rubber or the like. No. 396,640. Dunlop Tire and Rubber Goods Company Limited. (Douglas Bulgin).
Gelatine processing for improving its whipping qualities which comprises exposing powdered gelatine to ultraviolet radiation. No. 396,647. Industrial Patents Corporation. (David P. Grettie).
Gelatine processing for diaminizing, as by subjecting it to the action of nitrous acid and thereafter bleaching it. No. 396,648. Industrial Patents Corporation. (Donald P. Grettie).
Aminothiazole production method which comprises reacting paraldehyde with bromine at a temperature below 15° C. and adding the reaction product to thiourea in the presence of a solvent. No. 396,654. Mallinckrodt Chemical Works Limited. (Leonard C. Leitch and Leo Brickman).
Abrasive article production method in which the individual grains of abrasives are coated with a polymerizable compound which is fluid at room temperature and the latter polymerized by heat. No. 396,663. Norton Company. (Samuel S. Kistler and Carl E. Barnes).
Resin bonded abrasive body comprising abrasive grains bonded with copolymerized compounds comprising methyl methacrylate and ethylene glycol dimethacrylate. No. 396,664. Norton Company. (Samuel S. Kistler and Carl E. Barnes).
Resin bonded abrasive body comprising abrasive grains bonded with copolymerized compounds comprising methyl methacrylate and methacrylic acid. No. 396,665. Norton Company. (Samuel S. Kistler and Carl E. Barnes).
Resin bonded abrasive body comprising abrasive grains bonded with copolymer of compounds comprising methyl methacrylate and alkyl methacrylate. No. 396,666. Norton Company. (Samuel S. Kistler and Carl E. Barnes).
Resin bonded abrasive body comprising abrasive grains bonded with a rubber bond containing from 1 to 60 per cent. by weight of aniline-formaldehyde resin. No. 396,667. Norton Company. (Samuel S. Kistler).
Thiobarbituric acid compounds having therapeutic properties prepared by condensing with a thiourea a disubstituted malonic ester. No. 396,672. Parke, Davis & Company. (Arthur W. Dox).
Removing cations from water containing dissolved salts by passing water in contact with acid resistant lignite so long as cations are readily removed from the water, and regenerating the lignite by a weak acid wash. No. 396,673. The Permutit Company. (William Vaughan).
Water processing for retarding precipitation of calcium carbonate comprising adding to the water an alkali-metal hexametaphosphate in amount not exceeding 1/1000 part of the stoichiometric amount requred to react with said calcium to form calcium metaphosphate. No. 396,684. Shell Development Company. (Ludwig Rosenstein).
Nitric acid-metal chloride reaction apparatus. No. 396,688. The Solvay Process Company. (Arthur F. Keane and Herman A. Beekhuis, Jr.).
Explosive comprising lead styphnate in the form of plate-like crystals. No. 396,695. Western Cartridge Company. (Burvee M. Franz, John W. Wilkinson and Samuel D. Ehrlich).

Additional Patents Granted and Published May 20, 1941, will be given next month.